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Submissions should be sent to Professor Michael A. Hitt, *Academy of Management Journal*, College of Business Administration, Texas A&M University, College Station, Texas 77843-4221.

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FROM THE EDITOR

In the December 1991 issue, I announced that *AMJ* would publish five issues in 1992 and six in 1993. We will publish five issues with our regular articles (as opposed to four in previous years) and the sixth issue in 1993 will be used for innovations. In that issue, we intend to publish articles focused on topics in two special research forums. The Call for Papers for these forums follow this editorial. With the addition of two new issues for *AMJ*, we will be able to publish more of the high-quality research for which *AMJ* is known and move articles to print more quickly after they are accepted for publication. Furthermore, we will be able to publish articles on special topics such as those denoted in the Special Research Forums' Call for Papers printed in this issue. As a result, we hope to continue the tradition of high-quality scholarly contributions published in *AMJ*.

Our goal is to publish the two special forums announced herein in the sixth (December) issue of 1993. Both topics present an opportunity to publish work that will not only make a contribution to the management field, but also serve as a catalyst to future research. The forum on methodology, in particular, should facilitate future research in management. Our goal with this forum is to publish data-based research that demonstrates an innovative methodology, innovative uses of traditional methodology, and/or more effective understanding of current methods applied in management research. The goal is to stimulate creative approaches to the study of organizations and behavior within them. The other special research forum focuses on configurational approaches to organizations. Configurational approaches emphasize the viable combination of attributes that explain the behavior of organizations or the behavior within them. Much of this work has evolved from contingency and systems theories of organizations. Both forums are multidisciplinary; thus, we seek work from scholars in all disciplines represented by the Academy of Management.

We expect that each forum will encompass approximately 50 percent of the December 1993 issue. All manuscripts submitted will be reviewed in accordance with the usual *AMJ* process and evaluated using the normal *AMJ* criteria.

I hope that you are as excited as I am about these new developments for *AMJ*. Our goal is to continue to be the primary outlet for your scholarly empirical research in management.

Michael A. Hitt

SPECIAL RESEARCH FORUM CALL FOR PAPERS:
CONFIGURATIONAL APPROACHES TO ORGANIZATION

The *Academy of Management Journal* is pleased to announce a call for papers for a Special Research Forum on Configurational Approaches to Organization. Guest co-editors for the forum will be Bob Hinings, Alan Meyer, and Anne Tsui.

Out of the theoretically infinite set of possible combinations of organizational attributes, some theorists and researchers contend that only a relatively small subset constitute viable combinations that may characterize organizations empirically. Various dimensions of organization environments, technologies, strategies, structures, cultures, ideologies, processes, practices, and members have been said to cluster into configurations, archetypes, or gestalts. The term "organizational configuration" is used here to denote any multidimensional constellation of conceptually distinct variables that commonly occur together.

The purpose of this Special Research Forum is to synthesize and extend knowledge about organizational configurations. Configurations may arise from typologies developed conceptually or from taxonomies derived empirically. They may be situated at multiple levels of analysis, depicting common patterns within departments, divisions, organizations, or networks of organizations. Different configurations exhibit different interrelationships among constituent variables, such that classifying social units into configurations enables prediction of significant differences along dimensions not used to make the classification. This might occur, for example, if grouping organizations on the basis of technologies justified inferences about their employees' motives, or if grouping interorganizational alliances on the basis of forms of governance justified inferences about the partners' internal structures.

Suitable papers could show, for instance, that identifying configurations has important implications for the existence or the form of relationships between variables, that classification along certain dimensions predicts counterintuitive differences along other dimensions, or that controlling for configurations resolves a long-standing dispute in the literature. Because covariates of configurations might range from occupying unique ecological niches to following unique HRM practices, submissions by authors from diverse disciplines and all professional divisions of the *Academy of Management* are invited.

Configurations are evidenced by diverse organizational outcroppings, so methods ranging from ethnography to simultaneous equations may be used in gathering and analyzing data. Papers focusing on discontinuous or punctuated equilibrium models of change would be appropriate, because the configuration approach implies that significant organizational change often will require near-simultaneous changes in a host of interrelated variables. Human brains are inclined to perceive patterns even among random arrays of objects, thus papers treating configurations as products of managerial and organizational cognitions fit the domain of this forum. Finally, because organizational configurations can influence and be influenced by phenomena at many levels of analysis, we encourage authors to investigate cross-level effects.

In preparing manuscripts, authors should follow standard *AMJ* requirements specified in *AMJ*'s "Style Guide for Authors." Cover letters should request that papers be considered for this Special Research Forum. Five copies should be sent to Professor Michael Hitt, *Academy of Management Journal*, College of Business Administration, Texas A&M University, College Station, Texas 77843-4221. Papers must be received no later than September 1, 1992. All submissions will be blind reviewed in accord with *AMJ*'s normal review process and criteria. Prospective contributors wishing further information may contact Bob Hinings at (403)492-3054, Alan Meyer at (607)255-7134, or Anne Tsui at (714)856-4062.

SPECIAL RESEARCH FORUM CALL FOR PAPERS:
METHODOLOGICAL ISSUES IN MANAGEMENT RESEARCH

The *Academy of Management Journal* is pleased to announce a call for papers for a Special Research Forum on Methodological Issues in Management Research. Guest co-editors for this forum are Jean Bartunek, Philip Bobko, and N. Venkatraman.

The purpose of this special research forum is to encourage the development and application of innovative methodologies, innovative uses of traditional methodologies, and/or a more effective understanding of current methodologies applied in management research. The goal of this Special Research Forum is to stimulate approaches to the discovery of knowledge about organizations, thereby serving as a catalyst to future research in management.

Submissions must be methodologically focused on issues considered relevant to *management* inquiry. While statistical analysis is an important facet of research projects, this forum will not be devoted to describing the derivation of new statistics. In keeping with the *Journal's* empirical focus, submissions must be data-based. The topics considered should seek to demonstrate how a particular methodological orientation enhances (sharpens) our understanding in a substantive management content domain. Additionally, submitted manuscripts may demonstrate new facets of methodology and their applicability. Submissions that integrate across multiple methodological or disciplinary boundaries are particularly encouraged.

Examples that would fit the domain of this forum include a discussion of the limitations of LISREL applications in management research with substantive demonstration of problems or solutions; illustrations of how ethnographic methodologies can inform more traditional laboratory or questionnaire research (or the converse); the effects on both construct measurement and the resultant nomological net of correlations of different philosophical perspectives (e.g., about what difficulty means in goal-setting research or what effectiveness means for organizations); demonstrations of the use of discourse analysis and deconstruction in management research; the overlapping measurement needs for the research areas of organizational values, ethics, and performance appraisal. These illustrations are designed solely to spark creativity, not to constrain the types of methodology addressed.

In preparing manuscripts, authors should follow standard *AMJ* requirements specified in *AMJ*'s "Style Guide for Authors." Cover letters should request that papers be considered for this Special Research Forum. Five copies should be sent to Professor Michael Hitt, *Academy of Management Journal*, College of Business Administration, Texas A&M Univrsity, College Station, Texas 77843-4221. Papers must be received no later than September 1, 1992. All submissions will be blind reviewed in accord with *AMJ*'s normal review process and criteria. Prospective contributors wishing further information may contact Jean Bartunek at (617)552-4006, Philip Bobko at (908)932-3565, or N. Venkatraman at (617)253-5044.

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DIVERSIFICATION POSTURE AND TOP MANAGEMENT TEAM CHARACTERISTICS

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This study's argument is that a firm's diversification posture determines the degree of integration it needs across business units, which in turn influences the ideal composition of its corporate top management team. Archival data from 134 firms revealed that the degree of social cohesion and type of knowledge base within a firm's top management team were related to the degree of interdependence the firm's diversification posture demanded. Contrary to our hypotheses, experience in core functional areas among top team members was positively related to corporate performance in low-interdependence firms and negatively related to it in high-interdependence firms.

With the vast preponderance of America's largest manufacturing firms engaging in multiple lines of business (Baysinger & Hoskisson, 1989; Ravenscraft & Scherer, 1987), corporate diversification is an issue of great practical and theoretical significance. Early theorists focused primarily on the links between diversification strategy, structure, and processes (e.g., Berg, 1973; Chandler, 1962; Fouraker & Stopford, 1968; Pitts, 1974; Wrigley, 1970). However, following a path set out by Rumelt (1974), recent researchers have focused on the performance implications of different diversification strategies (e.g., Bettis, 1981; Bettis & Hall, 1982; Montgomery, 1979).

With a few exceptions (e.g., Gupta and Govindarajan, 1986), the emphasis on studying the fit between strategy and accompanying organizational arrangements has diminished. This change is unfortunate since optimally managing a particular type of diversification is as important as selecting a portfolio in the first place. In fact, some of the most vocal criticisms of multibusiness firms often have to do with mismanagement of their constituent pieces; critics have cited mechanical, formula-based control and allocation systems (Hamermesh & White, 1984; Hayes & Abernathy, 1980), unknowledgeable or ill-timed intrusions into business-level affairs (Vancil, 1979), and inability to achieve hoped-for synergies (Porter, 1985).

This study extends in a new direction the concept that different diversification strategies require different managerial approaches. Focusing on the management of total enterprises, our argument is that a firm's diversification posture determines the degree of integration needed across its business units. The more tightly related a firm's businesses, the greater the need for integration and coordination among them. This need for integration will influence the composition of a corporation's top management team, particularly affecting the degree of cohesion among top executives and the profile of their knowledge base. Moreover, to the extent that firms requiring a great deal of integration (such as vertically integrated firms) possess the requisite cohesion and knowledge base in their top management teams, they will experience good economic performance.

In sum, we posited two types of relationships: (1) a set of descriptive links between diversification posture and top management team composition and (2) a set of prescriptive links between top team composition and firm performance, which should be strongest for firms with a highly interdependent diversification posture.

THEORY DEVELOPMENT

Interdependence Requirements of Different Diversification Postures

Corporate interdependence is the degree to which the performance of a corporation as a whole depends on resource sharing and coordination among its constituent units. In keeping with our emphasis on the management of diversified firms, we examined Rumelt's (1974) four major types of diversified firms: unrelated, related-linked, related-constrained, and vertically integrated. We suggest that the overall degree of corporate interdependence increases as we move through the four types. At one extreme, unrelated firms face essentially no need for interdependence among business units beyond financial interdependence, whereas vertically integrated firms require intense, pervasive interdependence. Related-linked and related-constrained firms lie in between.

Unrelated firms. Facing the least need for interdependence are unrelated firms, which consist of generally autonomous divisions sharing virtually no resources. An example, from the period of Rumelt's (1974) study, is the Olin Corporation, involved in aluminum, polyvinyl chloride, books, recreation areas, mobile homes, furniture, and other disparate businesses. In such firms, investment projects are typically initiated at a divisional level, and corporate headquarters generally limit their role to granting or denying approval (Lorsch & Allen, 1973). The coordination requirements imposed on top management are primarily financial and consist of allocating capital and monitoring performance through highly quantitative control systems (Dundas & Richardson, 1982). Corporate managers generally refrain from direct intervention in divisional strategy and do not seek synergistic relations between divisions, as both those activities would compromise divisional autonomy and accountability, hence subverting the efficiency of capital allo-

cation and performance monitoring (Hoskisson, 1987; Williamson, 1975). The unrelated strategy involves a "pooled" interdependence (Thompson, 1967), in which the activities of subunits have little direct bearing on each other. There is no attempt in such a firm to achieve what Porter (1985) termed "horizontal strategy," the coordination of activities of different business units.

Related-linked firms. Some corporations diversify widely but in such a way that every business has some tangible relationship to at least one other business in the firm. For example, Rumelt (1974) described the evolution of the Carborundum Company to such a related-linked posture. In 1950, all of Carborundum's businesses relied directly on the firm's strength in producing and applying silicon carbide and aluminum oxide. However, in the 1950s the firm developed a line of grinding and cutting machines to complement its line of abrasives. Soon it introduced other types of industrial machinery and started producing replacement parts for machinery. Other of the original businesses led to similar tangential outgrowths.

Corporate management in a related-linked firm encounters some needs for interdependence in orchestrating flows among related businesses. However, for the most part, such needs exist not in the corporate office but rather between pairs of businesses or sometimes within clusters of businesses. For instance, in the Carborundum Company, if several machinery divisions want to share a castings plant, the need for interdependence occurs between them and will be resolved largely by a senior officer responsible for, say, a machinery group. The interdependences demanded by the related-linked posture are of limited breadth and typically involve subsets of divisions and not a whole company. Corporate management thus has some integrative role across business units, but that role is neither as broad nor as intense as it is in vertically integrated or related-constrained firms, to which we now turn.

Related-constrained firms. Firms that are diversified around some single core resource—a technology, a production process, an expertise—are diversified in a related, highly constrained manner: "each business [is] related to each other business and all could be seen as radiating from a common core" (Rumelt, 1974: 18). In such a case, corporate management faces a situation of extensive interdependence as it attempts to orchestrate the diffusion and sharing of the firm's core resource across the full array of business units. This situation constitutes a variant of Thompson's (1967) "reciprocal" interdependence, with corporate management serving both to gather informational and substantive resources from business units and to disseminate such resources. Corning Glass Works offers a good example of a related-constrained firm: it both restricts diversification to glass technology and actively attempts to disseminate and exploit glass technology throughout the company. We can expect top management to play a substantial role in promoting and orchestrating such company-wide resource exchanges.

The core resource of a related-constrained firm can be tangible (a distribution system) or intangible (a technological or marketing ability) (Porter, 1985). Rumelt's (1974) discussion indicated that intangible, "knowledge-

based" core competences prevailed among the related-constrained firms he examined. Where knowledge is at the heart of a company's diversification initiatives, the need for interdependence corporate officers face is typically periodic but not particularly intense or urgent. For example, Philip Morris has at various times applied its cigarette-marketing skills to beer, soft drinks, and packaged foods. These skill transfers have occurred on an irregular, not particularly urgent, basis, and have almost certainly not required ongoing daily or weekly interunit adjustments. In this respect, the interdependence needed with a related-constrained strategy, while considerable, is still less than that needed in a vertically integrated firm.

Vertically integrated firms. These firms have long-linked chains of activities, typically ranging from extraction of raw materials through refining and fabrication or assembly to distribution. The role of corporate management in such firms is to coordinate these chains and keep them smooth (Harrigan, 1983). Corporate management typically retains responsibility for overall product-market strategy and initiates investment projects (Ackerman, 1970). Moreover, vertically integrated firms face frequent, often urgent, needs for interdependence. For example, the work flow linkage that exists at Alcoa Corporation between its bauxite mines, smelting, and aluminum fabrication units presents an intense form of interdependence: coordination is essential to the fulfillment of routine endeavors. Thus, both the breadth and intensity of interdependence needs faced by corporate management in vertically integrated firms is considerable. As Rumelt noted, "The management task in this type of firm has to do with coordinating the elements in the processing chain; the emphasis is on balance, efficient throughput, and the adjustment of production capacity to demand. . . . general management must view the firm as a whole when considering the effect of any change in operations or resource allocation" (1974: 20).

Comparative Evidence and Summary

We have drawn upon several well-known studies to aid in the characterizations of the needs for interdependence faced by each of the four types of firms. However, several studies have pointedly examined differences among the various types, with results that further reinforce our arguments about interdependence. For example, Lorsch and Allen (1973) found that, relative to the conglomerates (unrelated firms) they studied, vertically integrated firms had higher levels of interdependence among major units, devoted greater effort to corporate-divisional integration, and had corporate-level senior vice presidents with more influence and stronger coordinative roles in divisional matters. A senior vice president in a conglomerate said,

> I work separately with each of the division general managers [in my group] mainly through discussion of their plans and budgets. . . . Essentially, my job entails selecting, motivating, and evaluating eight division general managers—and not on the basis of day-to-day contact. . . . I have very limited involvement in

interdivisional matters, either within this group or between groups (Lorsch & Allen, 1973: 150–151).

In contrast, a senior vice president in a vertically integrated firm reported,

> First of all, I'm concerned with the individual sales and profitability of [my] container and packaging divisions. . . . At the same time, I'm just as concerned with the issues . . . of product flow between the mills and the converting divisions. This entails three-way talks between my group, the corporate headquarters, and the mills (Lorsch & Allen, 1973: 151).

Using categories slightly different from Rumelt's, Vancil (1979) studied decentralization in over 250 firms. He found that unrelated firms, related firms (a category including both linked and constrained), and dominant firms (a category including but not limited to vertically integrated) differed significantly on dimensions that conveyed different levels of corporate interdependence, including the size and even the existence of corporate-level staffs, the autonomy of operating divisions, the number of interunit product transfers, and the number of common or shared facilities among business units.

Similarly, Pitts (1980), in a summary of his prior research, argued that acquisitive diversifiers (generally, unrelated firms)[1] pursue an internal design based on autonomous, financially monitored divisions but that internal diversifiers (generally, related firms) pursue a synergistic design in which there are large corporate staffs, interdivisional transfers of products, technologies, and people, and subjective performance appraisals that emphasize cross-unit collaboration.

Finally, evidence is available from Williamson (1975) and later tests of his theories. Williamson claimed that effective management of an M-form (multidivisional) organization requires corporate management to avoid involvement in divisional affairs. Unrelated firms are well known for most closely adopting M-form structures, and thus Williamson's argument is generally consistent with ours. Moreover, Hoskisson (1987) found adoption of M-form organization improved performance for unrelated firms but not for related or vertically integrated firms. His conclusion was that M-form structure is not well suited to meet interdependence needs in related and vertically integrated firms.

Table 1 summarizes the types and overall amounts of interdependence in each of the four types of diversified firms studied. When both the intensity

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[1] Researchers have not carefully examined the relationship between Rumelt's and Pitts's (1974) typologies. (Berg, 1973, also used the latter). However, a limited analysis suggests a high overlap between the two schemes. Berg (1973) and Pitts (1974, 1976) classified 26 firms as either internal or acquisitive diversifiers; 11 of those are also in Rumelt's sample. He rated all 7 internal diversifiers as related and the 4 acquisitive diversifiers as unrelated.

TABLE 1
Interdependence Requirements of Diversification Postures

Interdependence Characteristic	Diversification Postures			
	Unrelated	Related-Linked	Related-Constrained	Vertically Integrated
Breadth	No interdependence between units except financial.	Interdependences between pairs or triads of businesses; no corporate-wide interdependences.	Corporate-wide; all units rely on a central core resource.	Corporate-wide; every stage in a vertical chain somewhat dependent on every other stage.
Intensity	Low; strictly pooled interdependence.	Low or high, but no corporate-level resolution required.	Low or high; low-intensity, knowledge-based interdependence most prevalent.	High; frequent and urgent coordination and adjustments.
Overall degree of corporate interdependence	Low	Medium-low	Medium-high	High

and breadth of required coordination are considered, the four types range from low to high overall interdependence in the following order: unrelated, related-linked, related-constrained, and vertically integrated.

Top Management Team Characteristics Needed for Integration

A substantial literature has explored structural and process devices for coping with organizational interdependence; Galbraith and Kazanjian (1986) summarized that research. Proposed solutions for improving coordination have included instituting task forces, matrix structures, lateral information flows, co-location of related activities, and group-based rewards. Moreover, some researchers have examined solutions for coping specifically with the needs for interdependence posed by diversification; these have included planning systems (Vancil, 1979), reward systems (Pitts, 1980), coordinative structures (Porter, 1985), and assignments of strategic business unit (SBU) general managers (Gupta & Govindarajan, 1986).

Research on control systems provides an illustration of the administrative contrasts between low-interdependence and high-interdependence firms. Several investigators (Baysinger & Hoskisson, 1989; Hill & Hoskisson, 1987; Hill, Hitt, & Hoskisson, 1988; Hoskisson & Hitt, 1988; Vancil, 1979) have argued that unrelated-diversified (low-interdependence) firms emphasize financial control systems and that related-diversified (high-interdependence) firms emphasize strategic control systems. Financial control systems focus on short-term efficiency, using quantifiable criteria such as return on investment, profit, cash flows, and budgets; evaluation of division managers is based on profitability targets. Financial controls rarely address synergies or interrelationships among divisions but rather facilitate capital allocation based on relative yields (Hoskisson & Hitt, 1988). Strategic controls, on the other hand, are designed to encourage resource- and information-sharing among divisions and a focus on divisional performance. Strategic controls often include monitoring information other than financial data, such as operational and product-market information, to aid coordination among divisions and identify possible synergies; subjective evaluation of divisional managers; and open communications between the divisional and corporate levels (Baysinger & Hoskisson, 1989; Hill & Hoskisson, 1987; Hoskisson & Hitt, 1988).

However effective these and other administrative devices may be (an assessment not fully completed by prior research), an additional avenue for coping with corporate interdependence should be considered. Namely, certain managerial attributes of a corporation's top executives—their aptitudes, backgrounds, collaborative skills, and breadth of perspective—may be critical accompaniments of interdependence and its successful execution.

Formal control or planning systems, shared rewards, and direct communications and negotiations between business units cannot deal with all interdependences. To some degree, issues of interdependence—shared markets, technology spillovers, shared capacity allocations, transfer price disputes, managerial reassignments across businesses, and others—ultimately

require the involvement of the highest-level officers of a firm. Such involvement can take various forms: formulating plans for synergies across units, creating administrative systems and cultural norms to enhance resource sharing, and adjudicating territorial and resource-flow disputes between business units. When interdependences are corporate-wide and intense, as they are in related-constrained and vertically integrated firms, the need for top executives to devote their energies toward such matters is high; consequently their need to possess the managerial perspective, inclination, and aptitude needed to deal with interdependences is high. In fact, it could be argued that top executives of high-interdependence firms need such perspectives and aptitudes both in order to manage interdependences that rise to their level and to create structures and processes, such as the strategic control systems discussed above, that allow some interdependences to be dealt with at lower levels.

Our central idea thus extends the now widely held thought that a given manager or management team will not be equally adept in all settings. A long tradition of research in organizational behavior has argued for the need to match personal and task characteristics (e.g., Griffin, 1980; O'Reilly, 1977). More recently, theoretical work by Hambrick and Mason (1984) and Pfeffer (1983) and empirical work by Gupta and Govindarajan (1984) and Kotter (1982), among others, has strongly suggested that top managers have finite repertoires and should govern in situations that best suit their values, knowledge, and aptitudes.

A high level of corporate interdependence is a condition that seems to call for certain abilities and perspectives within a top management team. We suggest that a high level of interdependence tends to be accompanied by two important qualities in a top team: (1) social cohesion and (2) a corporate-wide operating knowledge base. Other managerial characteristics could also be posited, but these two have substantial theoretical foundations in previous research on managerial systems in diversified firms.

Demographic proxies for our two managerial constructs, social cohesion and knowledge base, were used. Several researchers (e.g., Hambrick & Mason, 1984; Pfeffer, 1983) have called for greater use of demographic variables in organizational research, citing the advantages of objectivity, parsimony, and possible replication. Despite their drawbacks as rough surrogates, demographics are particularly useful for gauging constructs that are otherwise unobservable, impractical to measure directly, or prone to unreliable measurement. The social cohesion and knowledge bases of top management teams are apt candidates for demographic proxies.

Our hypotheses refer to the interdependence accompanying a firm's diversification as a scalar construct. As summarized in Table 1, the four postures can be arrayed from low to high interdependence in the following order: unrelated, related-linked, related-constrained, and vertically integrated.

Social cohesion. Barnard (1938) was among the first theorists to argue that interpersonal and social cohesion can affect the performance of a man-

agement team. In doing so, he spoke of the need for a tight-knit "informal executive organization":

> The general method of maintaining an informal executive organ-
> ization is so to operate and to select and promote executives that
> a general condition of compatibility of personnel is maintained.
> Perhaps often and certainly occasionally men cannot be pro-
> moted or selected, or even must be relieved, because they cannot
> function, because they "do not fit," where there is no question of
> formal competence. This question of "fitness" involves such
> matters as education, experience, age, sex, personal distinction,
> prestige, race, nationality . . . (Barnard, 1938: 224).

Aside from its dubious ethical and legal implications today, Barnard's view that cohesion aids communication and collaboration has been strongly reinforced by later research (e.g., Roberts & O'Reilly, 1979; Rogers & Bhowmik, 1971; Wagner, Pfeffer, & O'Reilly, 1984). Although excessive cohesion may create a harmful insularity from external forces (Janis, 1972), evidence strongly indicates that cohesion facilitates the internal communication needed in situations of high interdependence.

We expected social cohesion within a top management team to be particularly prevalent in situations of high corporate interdependence. In vertically integrated and related-constrained firms, there is need for abundant interunit negotiation, compromise, and collaboration. This process is greatly aided if corporate managers have a well-developed rapport and a common outlook and language. Conversely, cohesion is not as important in situations of low interdependence. In such firms, corporate managers exist as discrete technical resources rather than as a coordinative entity.

The average tenure in a firm of a top management team's members can be expected to indicate cohesion. Long tenures reflect a self-selection process by which only those who embrace certain norms and perspectives are willing or allowed to stay in a firm (Pfeffer, 1983). Moreover, duration in a firm confers socialization, shared experiences, a common vocabulary, and the like (Katz, 1982). Managers with long tenures are more likely to have undergone common organizational experiences and hence are likely to have developed similar schemata (Norman, 1976) or dominant logics (Prahalad & Bettis, 1986). Schemata are cognitive structures used to organize knowledge of past experiences and are invoked when people make sense of new stimuli. Similarity of schemata among team members, developed via long tenures, can be expected to enhance cohesion as managers adopt common repertoires based on theories, beliefs, and attributions arising from past experiences. Since firms with a high degree of interdependence are expected to need a great deal of social cohesion within their top management teams, we can extend this argument to include the more observable expectation about tenures:

> *Hypothesis 1a: The more interdependent a firm's diversi-*
> *fication posture, the greater the average tenure in the firm*
> *of the members of its top management team.*

Social cohesion can also be expected to be derived from the demographic homogeneity of team members. Homogeneity on various dimensions could be considered; in this study we focused on homogeneity of the tenures and functional backgrounds of top team members.

In addition to average tenure, the sameness, or homogeneity, of tenure lengths within a top management team may contribute to cohesion. Tenure homogeneity defines a cohort, the presence of which has been shown to influence organizational outcomes. Moreover, members of a common cohort are more likely to have similar outlooks than individuals in different cohorts (Katz, 1982; McCain, O'Reilly, & Pfeffer, 1983; Wagner, Pfeffer, & O'Reilly, 1984). O'Reilly, Caldwell, and Barnett (1989) showed that tenure homogeneity was positively related to social integration at a work group level. And Zenger and Lawrence (1989) showed that age and tenure similarity influenced the frequency of communication both within and across groups. Although neither study was conducted at the upper levels of an organization, both support the idea that similarity in tenure contributes to group cohesion and communication.

Homogeneity of functional backgrounds also contributes to cohesion by endowing team members with similar frames of reference for problem solving (Dearborn & Simon, 1958; Gupta & Govindarajan, 1984). Like average team tenure, a common functional background contributes to the development of common schemata among team members and thereby increases cohesion by providing a common premise for decision making. Highly interdependent firms may select most of their top managers from a specific functional background that relates to a critical central skill of the firm. For example, the International Business Machines Corporation is well known for a predominance of marketing backgrounds in its top management team (HBS Case Services, 1979).

In sum, we expected two types of top management team demographic homogeneity to indicate social cohesion in firms with high interdependence:

> *Hypothesis 1b: The more interdependent a firm's diversification posture, the greater the tenure homogeneity of its top management team.*

> *Hypothesis 1c: The more interdependent a firm's diversification posture, the greater the functional homogeneity of its top management team.*

Corporate-wide operating knowledge base. Interdependence between subunits increases the information-processing requirements facing an organization (Galbraith, 1973; Tushman & Nadler, 1978). One way of managing the information requirements associated with interdependence is through the knowledge base of executives. For example, Lawrence and Lorsch (1967), in their study of six plastics firms, found that interdepartmental integrators held pivotal roles and that their effectiveness in large part depended on their

in-depth knowledge of multiple departments. Although this analysis pertained to functional departments, we expected a similar phenomenon to occur at a corporate level.

In situations of high corporate interdependence, firms are more likely to emphasize strategic controls designed to encourage synergy and cooperation among divisions (Baysinger & Hoskisson, 1989). However, as Porter (1985) and Hill and Hoskisson (1987) noted, cooperation does not occur without corporate involvement. Top management in these firms must possess knowledge of corporate-wide operating activities in order to exploit potential cooperation opportunities and coordinate interunit flows between business units. In low-interdependence firms, such knowledge is less relevant.

One method for obtaining such corporate-wide information is the transfer of executives across subunits. Executives who have been transferred have developed firm-specific "human capital" (Becker, 1962; Williamson, 1975), which imbues them with a firm-wide perspective, minimizes the potential for subunit parochialism, and provides them with the requisite knowledge base for negotiating, arbitrating, and coordinating interunit relations.

In keeping with this argument, Pitts (1976) found that internal diversifiers (essentially, related-diversified firms) tended to systematically move their managers across subunits. His acquisitive diversifiers (essentially, unrelated firms) had no such policies. We expected that firm-wide experiences among top executives would be more prevalent in high-interdependence firms.

> Hypothesis 2a: The more interdependent a firm's diversification posture, the greater the average number of interunit moves the members of its top management team have made within the firm.

Core function expertise. A central argument in the strategy literature is that organizations should emphasize functional activities that are critical to the effective implementation of their chosen strategy (Hitt, Ireland, & Palia, 1982; Snow & Hrebiniak, 1980). Building on this premise, we expected that firms with high degrees of corporate interdependence would possess top teams steeped not only in company-wide knowledge, but also in certain core operational areas—marketing, operations, and R&D. Top managers in highly interdependent firms are required to understand and assess the substantive, rather than strictly financial or administrative, implications of their decisions. This is particularly true in vertically integrated firms, where capacity and technology decisions have major firm-wide effects. In support of such a view, Song (1982) found that the chief executive officers (CEOs) of internal diversifiers (again, largely all related firms) tended to rise through careers in operations and marketing, but the CEOs of acquisitive diversifiers (unrelated firms) tended to rise through finance, accounting, and law. Hayes and Abernathy's contention that the latter type of CEO is without "intimate hands-on knowledge of the company's technologies, customers, and suppliers"

(1980: 74) may be a valid concern for firms with high corporate interdependence, but less of a concern for firms with low interdependence. Thus,

> *Hypothesis 2b: The more interdependent a firm's diversification posture, the greater the proportion of the members of its top management team whose primary functional careers were in operations, marketing and sales, and R&D.*

Implications for performance. Our final hypothesis concerns the implications that a top management team's social cohesion and knowledge base have for performance. The previous hypotheses deal with the tendency for a descriptive correspondence to exist between diversification posture and top management team characteristics. However, the composition of some teams may deviate from the profile that might be expected on the basis of the firms' diversification postures alone. Such deviations could occur because of internal political or interpersonal factors, managerial shake-ups and departures, inertial, tradition-bound internal labor markets, and more.

Particularly to the extent that firms with high-interdependence diversification postures do not possess the requisite social cohesion and knowledge base within their top management teams, their economic performance will suffer. Such teams can be expected to manage their firms' interdependences suboptimally or to need to resort to expensive and cumbersome coordination devices. These expectations are consistent with research arguing more broadly that managers' characteristics should match the requirements of a firm's strategy (Gupta & Govindarajan, 1984; Leontiades, 1982; Szilagyi & Schweiger, 1984). Thus,

> *Hypothesis 3: The more interdependent a firm's diversification posture, the greater the positive association between (1) its top team's social cohesion and company-wide operating knowledge base and (2) corporate performance.*

METHODS

Data and Sources

From Rumelt's (1978) *Databank on Diversification and Corporate Structure,* we drew 134 *Fortune* 500 firms. Rumelt (1978) classified each of these firms by diversification strategy through the year 1974. Since his scheme has been widely used in diversification research, we do not discuss it in detail here. The Appendix provides a brief description.

Our study was limited to firms Rumelt classified as being in one of our four categories in 1974. Rumelt also provided historic data on changes in strategies, enabling us to reinforce our treatment of strategy as an independent variable by further limiting the study group to firms that had maintained stable strategies between at least 1971 and 1974. We excluded 11 firms because their strategies were unstable. With average sales of $2.12

billion and an average return on equity of 12.8 percent in 1974, the companies studied did not differ significantly from the *Fortune* 500 as a whole and could be considered representative on at least those dimensions.

For some analyses, we assigned firms ratings on a four-point ordinal scale based on increasing interdependence (unrelated = 1, related-linked = 2, related-constrained = 3, and vertically integrated = 4). Previous work supports the assignment of an ordinal ranking to Rumelt's diversification categories (Keats & Hitt, 1988).

Data on top management teams in 1973 were obtained from the *Dun and Bradstreet Reference Book of Corporate Management*. A company's top team was defined as including all officers above the level of vice president (e.g., senior vice president, vice chairman, CEO) and any other officers who were on the board of directors. The mean number of top team members for the companies studied was 6.18, with a standard deviation of 2.68. Actual coding of management backgrounds was conducted by the principal author and trained research assistants following a detailed set of coding instructions. The coding of most of the variables was clear-cut and objective; the principal author checked the coding of variables that had some subjective elements (e.g., functional background) in its entirety. Coding the Dun and Bradstreet entries is relatively straightforward. For example, using the same data source and coding criteria and instructions we used, Barbosa (1985) found in a mail survey that 82 percent of a random sample of corporate officers identified their own dominant functional career track (from among eight categories) as the same one he had identified.

Financial performance data were taken from the COMPUSTAT tapes and averaged for the years 1973–76.

In summary, the chronology of the data fit the model we sought to test: a given diversification posture, stable between 1971 and 1974, will be accompanied by certain top management team characteristics observed in 1973, which in turn will have implications for current and near-term performance (1973–76).

Measures

Tenure was measured as the mean number of years the members of a top management team had spent with a firm.

Tenure *homogeneity* was based upon the coefficient of variation for top management team tenure. To convert the measure from a heterogeneity indicator to a homogeneity indicator, we subtracted each firm's coefficient of variation from 1.43, the highest value in the firms studied. The coefficient of variation is commonly used to capture demographic homogeneity and heterogeneity (O'Reilly et al., 1989; O'Reilly & Flatt, 1989). Allison (1978), in a review of inequality measures, argued that the coefficient of variation is a preferred dispersion measure for variables such as tenure.

The *functional homogeneity* of teams was measured by a variation of the Herfindal-Hirschman index (cf. Blau, 1977; Scherer 1980):

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$$H = \sum_{i=1}^{9} S_i^2,$$

where H is homogeneity and S_i is the percentage of a top management team's members with dominant functional career track i. A dominant functional career track was defined as the area in which a manager had spent more time than in any other. In this study, i took on the values 1 to 9, representing the following functional tracks: production-operations, research & development, finance, accounting, general management, marketing, law, administration, and personnel and labor relations. H can take on values from 0 to 1, with high values indicating that a top team is homogeneous, with typically one or two areas dominant.

Interunit moves was coded as the mean number of times team members had moved between distinct lines of business within a company. For example, a move from the General Electric Company's large turbine business to its locomotive business would be counted as an interunit move, whereas a move from the large turbine business to the small turbine business would not.

Core function expertise was measured as the percent of team members whose primary functional careers had been in production-operations, marketing, or R&D.

In an effort to assess the reliability of the demographic coding, we had the two variables most open to coder interpretation—interunit moves and core function expertise—recoded for a random sample of 30 executives by three new coders who received the same training and instructions as the original coders. The average correlation between their ratings and the original ratings for interunit moves was .72, and the average correlation between their ratings and the original ratings for core function expertise was .86. These high levels of interrater agreement suggest that the measures possess a substantial degree of reliability.

Profitability was measured as return on assets (ROA), defined as net income after taxes divided by total assets (and averaged for 1973–76). Highly correlated with return on equity (ROE), ROA has two advantages: it is less sensitive to firm capital structure and allows comparisons with numerous other studies on diversification that have used it as a measure (Bettis, 1981; Bettis & Hall, 1982). Of course, ROA is subject to the limitations of all accounting-based measures, such as variations in inventory valuation, depreciation schedules, and historical costs.

Since team characteristics may also arise from variables outside our theoretical model, we included as controls the two most prominent variables in the demographics literature (Pfeffer, 1983): firm size and firm age. Previous research has argued that size is related to most organizational variables (Kimberly, 1976). More specifically, Dalton and Kesner (1983) showed that small organizations are more likely to bring outsiders into their top teams than large organizations. Therefore, it is important to control for the ex-

pected influence of size on the average tenure of top managers. Additionally, firm age must be controlled since young organizations have a lower boundary on team tenure than old organizations. *Firm age* was the remainder of 1974 minus the year a firm was founded as reported by *Moody's Industrial Manual. Firm size* was measured as the logarithm of total assets averaged for 1973–76.

Weighted industry profitability was also included as an important control in the performance analyses. This variable was measured by multiplying the aggregate ROA of each two-digit industry a firm was engaged in by the percentage of the firm's sales derived from that industry, summed over all the firm's industries. This measure provides a gauge of the ROA that could be expected, on the average, given a company's portfolio of businesses. We obtained figures for industry ROA from the Internal Revenue Service's *Statistics of Income—Corporate Income Tax Returns* and averaged them for the years 1973–76. The percentages of firms' activities in various industries were made available to us by Rumelt, who collected data corresponding approximately to the year 1973 on the industry commitments of firms using several sources: annual reports, 10K statements, prospectuses, investment analysts' reports, *Moody's,* and direct inquiries (Rumelt, 1982).

RESULTS

Table 2 presents the means, standard deviations, and correlation coefficients among all variables. None of the variables measuring top management team attributes approach redundancy, with the highest correlation, that between tenure and tenure homogeneity, being .55. However, several moderate intercorrelations suggested that conducting a multivariate analysis was important.

Differences in Team Composition

Table 3 presents results of tests assessing Hypotheses 1a, 1b, 1c, 2a, and 2b, which predict differences in top team composition depending on the diversification postures of firms. Simple Spearman correlations between each team attribute and the four-point ordinal strategy scale reveal tentative support for some of the propositions. Results of analysis of variance tests (not presented), which do not assume ordinality of the strategy categories, led to the same conclusions. Means for each strategy category indicate the profiles of the four types of firms.

Among the cohesion indicators, team tenure was strongly related to strategy ($r = .42$, $p < .001$), with means increasing from 15 years for unrelated firms up to nearly 25 years for vertically integrated firms. No bivariate relationship was found between tenure homogeneity and strategy. Functional homogeneity, contrary to expectations, was negatively related to interdependence. As the means show, the unrelated firms scored particularly high. A separate analysis revealed that this pattern reflected the tendency of unrelated firms to be dominated by finance and legal executives (e.g., Song, 1982).

TABLE 2
Descriptive Statistics and Correlations[a]

Variables	Means	s.d.	1	2	3	4	5	6	7	8	9
1. Diversification strategy	2.51	1.06									
2. Profitability	0.06	0.03	.21*								
3. Weighted industry profitability	0.08	0.04	.23**	.31***							
4. Firm size	6.85	1.06	.30***	.25**	.29***						
5. Firm age	71.24	28.62	.33***	.21*	.09	.11					
6. Tenure	21.27	7.62	.42***	.20*	.21*	.32***	.22*				
7. Tenure homogeneity	0.46	0.25	.08	.13	.15†	.15†	.09	.55***			
8. Functional homogeneity	0.39	0.17	-.29***	-.08	-.14	-.18*	-.08	-.17*	-.16		
9. Interunit moves	0.46	0.48	.23**	.19*	.28**	.54***	.06	.39***	.22*	-.03	
10. Core function expertise	0.31	0.23	.39***	.04	.09	.21**	.23**	.37***	.20*	-.38***	.23**

[a] $N = 134$; statistics are Spearman correlations for variables involving strategy, Pearson correlations otherwise.
† $p < .10$
* $p < .05$
** $p < .01$
*** $p < .001$

TABLE 3
Means and Standard Deviations of Team Attributes by Diversification Posture and Results of Tests for Significant Differences

Variables	Unrelated		Related-Linked		Related-Constrained		Vertically Integrated		Spearman r	Multiple Regression with Strategy as Dependent Variable	
	Means	s.d.	Means	s.d.	Means	s.d.	Means	s.d.		b	s.e.
Team attributes											
Tenure	15.00	7.48	21.56	8.09	22.92	6.41	24.75	4.92	.42***	.051***	.013
Tenure homogeneity	0.93	0.27	0.96	0.26	0.96	0.27	1.00	0.18	.08	−.804*	.372
Functional homogeneity	0.48	0.23	0.39	0.12	0.34	0.13	0.37	0.18	−.29***	−.571	.494
Interunit moves	0.34	0.52	0.46	0.52	0.45	0.40	0.59	0.48	.23**	−.200	.202
Core function expertise	0.18	0.22	0.27	0.12	0.35	0.13	0.44	0.18	.39***	.881*	.390
Controls											
Firm size										.171†	.089
Firm age										.007**	.003
Intercept										.553	.725
N	29		37		39		29				
R^2										.34***	
F										9.1	

† $p < .10$
* $p < .05$
** $p < .01$
*** $p < .001$

The two variables assessing the knowledge base of top teams were also highly correlated with strategy. Specifically, as we move from the strategy requiring the least interdependence, unrelated diversification, to that requiring the most—vertical integration—we observe significant positive associations with both interunit moves ($p < .01$) and core function expertise ($p < .001$).

To test the independent and combined relationships between team attributes and strategy, we conducted a multiple regression analysis treating strategy as a four-point ordinal scale (1 = unrelated, 4 = vertically integrated).[2] The use of the ordinal ranking in this analysis and in the prescriptive analysis presented below deviates from the regression assumption of interval data. However, the work of Keats and Hitt (1988) and several Monte Carlo studies (e.g., Labovitz, 1970) have suggested that the use of an ordinal scale is not a serious problem.

Although they were not as widely significant as those of the simple correlations, the results of the overall regression analysis were highly significant ($p < .001$) and revealed a considerable link between strategy and team characteristics. Even after we accounted for the fact that the high-interdependence firms studied were older ($p < .01$) and larger ($p < .10$) than the others, the tenures of their top teams were longer ($p < .001$). The high-interdependence firms also had more core function expertise within their teams than did the firms with low interdependence ($p < .05$). Whereas the bivariate analysis revealed no relationship between tenure homogeneity and strategy, multivariate analysis revealed a significant, negative relationship ($p < .05$). This result was contrary to that hypothesized, with high-interdependence firms having less tenure homogeneity than low-interdependence firms.[3]

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[2] We also conducted multiple discriminant and "LOGIT" analyses, both more technically appropriate to the categoric strategy variable. Their results were very similar to those arrived at with the regression analysis but allowed far less parsimony in presentation, requiring either several "pair-wise" comparisons or the collapsing of strategic categories. The concordance among the several approaches strongly indicated that the regression approach was satisfactory.

[3] This negative coefficient for tenure homogeneity begs for some clarification in light of the slightly positive (although insignificant) bivariate association between tenure homogeneity and strategic interdependence. Recall that the tenure homogeneity measure is essentially an inverted coefficient of variation. Thus, the homogeneity measure varies positively with mean tenure and negatively with the standard deviation of tenure. Inasmuch as mean tenure is highly positively related to strategic interdependence ($r = .42$), there is bound to be a strong upward influence on the association between tenure homogeneity and strategy. That the correlation is an insignificant .08 strongly indicates that the standard deviation is exerting a substantial offsetting influence. Once the increasing means are controlled for, as in the multiple regression, the increasing nonhomogeneity of teams, as a function of strategic interdependence, becomes evident in the significant negative coefficient.

We tested the stability of our results by using two alternative homogeneity measures. When either the standard deviation of tenure (converted to a homogeneity measure) or Zenger and Lawrence's (1989) homogeneity measure is substituted for our measure, the results are as follows: tenure homogeneity declines monotonically over the four strategies, the Spearman correlation between tenure homogeneity and the four-point strategy scale is strongly negative, and

(continued)

The overall results and conclusions to be drawn from the various analyses conducted are as follows: (1) the high-interdependence firms are larger and older, (2) even after we controlled for the size and age of those firms, the members of their top management teams still have longer tenures, less tenure homogeneity, and more core function expertise than the top managers of low-interdependence firms, and (3) their long tenures and greater size seem to fully account for their high ratings on interunit moves. Not surprisingly, the longer managers are in a firm and the larger the firm, the more inherent opportunity they have to move around.

In sum, substantial differences in top team profiles were linked to the diversification postures of the firms studied. The tendencies for high-interdependence firms to have teams composed of long-tenured members, high variation in tenure among members, and members with primary expertise in core functions were particularly strong.

Performance Patterns

Hypothesis 3 predicts that team cohesion and a corporate-wide operating knowledge base will have a more positive association with performance in firms with high-interdependence strategies than it will in those with low-interdependence strategies. To test this prediction, we used a moderated regression analysis with return on assets (ROA) as the dependent variable. To establish the main effects, we first included only team characteristics and the control variables, including weighted industry profitability. As the second step, we included the same variables but added interactions between strategy, measured on a four-point scale, and team characteristics. In this analysis, support for Hypothesis 3 could be revealed in two ways: (1) significant positive coefficients for the strategy-by-team interaction terms and (2) a significant increase in the R^2 when the interaction terms were added to the equation.[4]

Table 4 presents results of this analysis. Model 1 is the regression equation without interaction terms. The results of the overall equation are significant ($R^2 = .16$, $p < .01$), confirming the importance of industry profitability as a determinant of firm performance among diversified firms (Christensen & Montgomery, 1981; Montgomery, 1985; Rumelt, 1982). None of the team variables are significantly related to ROA.

The overall results of the full regression equation, including the interaction terms (model 2, Table 4), are highly significant ($p < .001$). Moreover, the value of the R^2 (.24) is significantly greater ($p < .05$) than that for the equation without interaction terms (Cohen, 1968). Thus, overall support

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the coefficient for tenure homogeneity in the multiple regression is significantly negative. Thus, our multivariate results are stable and most revealing of underlying patterns.

[4] We also examined regression equations in which we added each interaction term in turn while holding out the other interaction terms, since multicollinearity could be a problem. The results were essentially like those we present for all five interactions entered together.

TABLE 4
Relationships of Team Attributes and Strategy to Profitability

Variables	Model 1		Model 2	
	b	s.e.	*b*	s.e.
Intercept	−.005	.024	−.074	.045
Strategy	.000	.003	.022	.014
Weighted industry profitability	.200	.079*	.203	.082*
Firm size	.004	.003	.006	.003*
Firm age	.000	.000	.000	.000
Tenure	.000	.000	.001	.001
Tenure homogeneity	.002	.013	.037	.029
Functional homogeneity	−.000	.017	.002	.037
Interunit moves	.002	.007	−.007	.015
Core function expertise	−.010	.013	.081	.035*
Tenure × strategy			−.000	.000
Tenure homogeneity × strategy			−.014	.013
Functional homogeneity × strategy			.005	.014
Interunit moves × strategy			.002	.006
Core function expertise × strategy			−.033	.012**
R^2	.16**		.24***	
ΔR^2			.08* (by F test)	

* $p < .05$
** $p < .01$
*** $p < .001$

emerges for the premise that companies with different diversification strategies require different top management team characteristics to perform well.

Although the full set of five interaction terms significantly increases the explained variance in performance measured as ROA, only one of the five—core function expertise—fully accounts for this effect. Contrary to expectations, the interaction between core function expertise and strategy is negatively associated with ROA. The less interdependent firms benefited more from having top teams well steeped in knowledge about core functions. Since interaction terms are often difficult to interpret, this finding can be clarified by examining the simple correlations between core function expertise and performance for each of the four diversification categories, which are as follows (Table 5): unrelated = .31, related-linked = .22, related-constrained = .06, and vertically integrated = −.50. This general counter-to-hypothesis pattern further reveals that core function expertise is positively related with profitability for the less interdependent firms, whereas a strong negative relationship between the two variables exists for highly interdependent (vertically integrated) firms.

The results show a significant interaction between top team attributes and strategy affecting performance. The addition of the interaction terms increased the variance explained by over 50 percent, from .16 to .24. How-

TABLE 5
Correlations Between Team Attributes and Profitability by
Diversification Posture

Team Attributes	Unrelated	Related-Linked	Related-Constrained	Vertically Integrated
Tenure	.04	.37**	.12	−.06
Tenure homogeneity	.24	.18	.17	−.13
Functional homogeneity	−.15	−.03	−.03	.20
Interunit moves	.18	.16	.19	.25
Core function expertise	.31†	.22	.06	−.50**

† $p < .10$
* $p < .05$
** $p < .01$

ever, the influence of the interactions is far from pervasive—only one of the team attributes was significant, and its direction was counter to hypothesis. Nonetheless, the descriptive findings, in conjunction with the performance findings, help outline a new picture of variation in top teams by firm diversification strategy type and the implications of that variation for performance.

DISCUSSION

Whether it is an implicit norm or an explicit policy, the tendency of vertically integrated and related-constrained firms is to appoint long-tenured people to their highest posts. Thus, their top management teams consist of individuals who are not only likely to know each other well, but who are also likely to know many parts of the company through first-hand experience. These long tenures have a cascading effect, directly conferring cohesion and indirectly conferring company-wide knowledge by allowing interunit moves. We theorized that both cohesion and company-wide knowledge would be important team qualities in high-interdependence settings. The apparent result of the appointment of long-tenured individuals would seem to be strongly shared meanings and values within a corporate management team.

The long tenures found in the vertically integrated and related-constrained firms we studied suggest that we may be observing "clan" organizations (Ouchi, 1980). Long tenures have been found to be an integral feature in clans (Kerr & Slocum, 1987; Ouchi, 1980). Other prominent features include fraternal relationships among members, an emphasis on collective rather than individual initiative, and well-developed socialization systems. "Market" organizations (Ouchi, 1980), on the other hand, tend to have features resulting in short tenures: membership is seen as a contractual relationship subject to abrupt termination, individual initiative and performance are emphasized, and there is little socialization. This study did not examine enough organizational attributes or extract rich enough information

to allow any conclusions about the overlaps between Rumelt's strategy typology and Ouchi's culture typology, but the tentative inference that interdependence is associated with clan-like features seems highly plausible. Moreover, it is possible that the origins of corporate cultures, which have so far gone unexplained, lie in part in the amounts and types of interdependences firms' strategic endeavors demand.

Our second very stable finding was that high-interdependence firms had more top team members with primary expertise in core functions (operations, marketing and sales, and R&D) than did low-interdependence firms. As hypothesized, the backgrounds of top managers in high-interdependence settings were consistent with their roles in monitoring, negotiating, and decision making in substantive realms—products, markets, technologies, and facilities. Similarly, the backgrounds of the low-interdependence teams, which were predominantly in finance, law, accounting, and general management, mirrored their key tasks: allocating capital via formal planning and budgeting systems, monitoring and sanctioning quantitative measures of performance, and acquiring and divesting businesses (Dundas & Richardson, 1982).

Our final descriptive finding concerns tenure homogeneity. Contrary to expectations, we found that high-interdependence firms displayed lower levels of tenure homogeneity than less interdependent firms. One possible interpretation of this result can be found by returning to the idea of clan organizations. If the high-interdependence firms studied have adopted clan-like features, their higher tenure heterogeneity may be reflecting dispersed tenures around a high mean tenure. These organizations may have a policy of staggering team membership to provide for smooth successions and high team continuity over time. Staggered teams increase tenure heterogeneity but enhance stability and provide opportunities for the mentoring and grooming of heirs. The team recreates itself slowly, gradually engendering commitment to a core business, shared perspectives, and perpetuation of a given strategy.

In contrast, low-interdependence firms may be appointing their teams as teams—groups of people with relatively similar organizational tenures who will work together for some period of time and eventually be replaced by another cohort. Approximating Ouchi's market culture, such firms retain executives as long as they perform adequately and replace them, sometimes en masse, when performance falls. At a given point, the members' high level of tenure homogeneity may enhance team cohesion, especially in light of their low average tenure. However, the appointment of a team as a unit offers little opportunity for the gradual grooming of successors and suggests a low level of team continuity over time. Indeed, the opportunity for any persistent commitment to a core business is greatly reduced in this "revolutionary," as opposed to "evolutionary," team succession model (Tushman & Romanelli, 1985). Low team continuity over time may benefit low-interdependence firms by restricting their commitment (Staw, 1981) to given lines of business.

Each team starts fresh and can acquire and divest businesses strictly on the basis of formalized capital allocation models.

Two examples help to illustrate archetypal teams in these extreme diversification categories. The top managers of the Goodyear Tire and Rubber Company, a vertically integrated firm, had tenures of 13, 18, 22, 30, 32, 36, and 40 years. In contrast, the top managers of Colt Industries, an unrelated firm, had tenures of 11, 11, 11, 12, and 13 years. At Goodyear, the high average tenure and wide staggering of tenures provided opportunity for commitment to the core business as well as for an orderly succession process, complete with mentoring, successor grooming, and so on. At Colt, the relatively low average tenure may have limited the team's commitment to any business; the tight clustering of tenures suggests the appointment of the entire team within a narrow time frame, and consequently we could expect the departure of the entire team within a relatively narrow time frame.

These interpretations based on Ouchi's research are speculative and await further study. However, such views are quite consistent with our combined descriptive and prescriptive findings.

Our only significant prescriptive finding, concerning core function expertise, was contrary to expectation. The more interdependent a firm's diversification strategy, the less positive was the association between core function expertise and profitability. In fact, for the most interdependent firms, the vertically integrated ones, we saw a strong negative association.

The descriptive tendency was for strong, even monotonic, increases in core function expertise across the four strategy types. However, the performance results suggest the possibility that these archetypal differences were excessive: at the extremes, the average unrelated firm may have had managers with less core function expertise than was optimal, and the average vertically integrated firm may have had managers with more expertise than was appropriate. In the unrelated firms studied, teams may have had critical voids in operating knowledge, impairing their ability to evaluate division requests, performance patterns, and acquisition candidates beyond the most superficial financial and administrative levels. Although the executives of the average unrelated firm may not need as much core function expertise as those of a firm with a more interdependent diversification posture, they may need more such expertise than was typically possessed.

Litton Industries provides a graphic example of an unrelated firm whose top managers may have had too little understanding of the substantive products, markets, technologies, and competitors with which they were dealing. Only 10 percent of its top management team had core function experience, compared to an overall study average of 31 percent and an average of 18 percent for the unrelated firms. However, Litton's businesses were competitively and technologically very complex, including calculators, copiers, navigation systems, machine tools, and medical equipment. It can only be expected that such a top team would be unable to move beyond relatively detached financial controls for making major business judgments and that

the health of the firm would suffer. Litton's accompanying low return on assets of 1.1 percent suggests that such problems may have in fact existed.

The case of the vertically integrated firms is even more intriguing. As expected, these firms generally had a very high percentage of their top executives drawn from core functions. However, such extreme team profiles appear to have been counterproductive in terms of performance, as evidenced by the significant negative interaction term shown in Table 4 and the very large negative correlation ($r = -.50$) between core function expertise and performance for this group (Table 5). The implication is that these firms may have benefited from more objective, staff-analytic executives who were not overly committed to a specific business or way of operating. In this vein, Rumelt concluded that a major problem of vertically integrated firms is the tendency of top management to develop "values and attitudes that assign existential worth to the products or processes themselves" (1974: 137).

Also pertinent is Hayes and Abernathy's (1980) contention that top executives with experience in the tangible areas in which their firms compete—marketing and sales, operations, and R&D—will produce superior returns. Our results suggest that Hayes and Abernathy were not correct in any blanket sense and that the value of top executives experienced in tangible operating areas is contingent on a firm's strategy. The increasing preponderance of top executives drawn from staff areas such as law and finance is not a universally negative development and appears, in some instances, to contribute a much needed countervailing influence.

SUMMARY AND LIMITATIONS

This study suggests that the profiles of top management teams are associated with their firms' diversification postures. The greater the need for interdependence posed by a firm's diversification strategy, the greater its top team's firm-wide operating knowledge base. Significant differences were also found for top team indicators of social cohesion. As expected, top executives of high-interdependence firms had significantly longer tenures, but contrary to expectation, they had lower tenure homogeneity than the executives of low-interdependence firms. The findings for average tenure and core function expertise support our underlying premise that high-interdependence firms face a managerial task of coordination, cross-unit cooperation, negotiation, and compromise, all of which are aided by a top team's cohesion and its substantive understanding of a firm's businesses. The finding for tenure homogeneity argues against our underlying premise, although the possibility that high-interdependence firms adopt staggered teams to provide continuity and cohesion over time is plausible and worthy of future research.

There were not only descriptive differences in team composition across diversification categories, but also different associations with profitability. The functional expertise represented in teams had significant and sometimes unexpected effects, depending on firm strategy. Considered jointly,

the descriptive and prescriptive findings for core function expertise suggest that top teams are sometimes not configured as they should be. Some of the high-interdependence firms studied had high levels of core expertise but may have benefited from lower levels. Some low-interdependence firms had low levels of core expertise but may have benefited from higher levels. Thus, although top team characteristics display different performance associations across diversification postures, they do so in a more complex fashion than we originally hypothesized.

Several limitations in the project need to be highlighted. The study was cross-sectional, not longitudinal, so causality cannot be established from the data. It is plausible both that executives embark on diversification initiatives in line with their competences (Hambrick & Mason, 1984) and that certain types of firms tend to promote executives who fit the critical task at hand. Actually, over time a reinforcing spiral probably occurs (Miles & Snow, 1978) in which managers pick strategies to suit their competences, successors are picked to suit the strategies, and so on. If so, establishing causality will be difficult. Second, the demographic data provide very detached surrogates of actual team characteristics. Such data have the advantage of objectivity and ease of access, but replications with clinical and psychometric data are needed. Finally, our data are dated. It is difficult to assess how underlying patterns may have changed since the early 1970s, but they may have done so.

These limitations point to the need for refinements and extensions of the present study. Above all, there is a great need to examine the people at the top reaches of organizations, and great promise in doing so.

REFERENCES

Ackerman, R. W. 1970. Influence of integration and diversity on the investment process. *Administrative Science Quarterly*, 15: 341–351.

Allison, P. D. 1978. Measures of inequality. *American Sociological Review*, 43: 865–880.

Barbosa, R. R. 1985. *Innovation in a mature industry.* Doctoral dissertation, Columbia University, New York.

Barnard, C. I. 1938. *The functions of the executive.* Cambridge, MA: Harvard University Press.

Baysinger, B., & Hoskisson, R. E. 1989. Diversification strategy and R&D intensity in multiproduct firms. *Academy of Management Journal*, 32: 310–332.

Becker, G. S. 1962. Investment in human capital: A theoretical analysis. *Journal of Political Economy*, 70: 9–49.

Berg, N. A. 1973. The corporate role in diversified companies. In B. Taylor & K. MacMillan (Eds.), *Business policy: Teaching and research:* 230–245. New York: Wiley.

Bettis, R. A. 1981. Performance differences in related and unrelated firms. *Strategic Management Journal*, 2: 379–393.

Bettis, R. A., & Hall, W. K. 1982. Diversification strategy, accounting determined risk, and accounting determined return. *Academy of Management Journal*, 25: 254–265.

Blau, P. 1977. *Inequality and heterogeneity.* New York: Free Press.

Chandler, A. D. 1962. *Strategy and structure.* Cambridge, MA: MIT Press.

Christensen, H. K., & Montgomery, C. A. 1981. Corporate economic performance: Diversification strategy versus market structure. *Strategic Management Journal,* 2: 327–343.

Cohen, J. 1968. Multiple regression as a general data-analytic system. *Psychological Bulletin,* 70: 426–443.

Dalton, D. R., & Kesner, I. F. 1983. Inside/outside succession and organization size: The pragmatics of executive replacement. *Academy of Management Journal* 26: 736–742.

Dearborn, D. C., & Simon, H. A. 1958. Selective perception: A note on the departmental identifications of executives. *Sociometry,* 21: 140–144.

Dun & Bradstreet. 1974–75. *Dun & Bradstreet reference book of corporate management.* New York: Dun & Bradstreet.

Dundas, K. M., & Richardson, P. R. 1982. Implementing the unrelated product strategy. *Strategic Management Journal,* 3: 287–301.

Fouraker, L. E., & Stopford, J. M. 1968. Organizational structure and multinational strategy. *Administrative Science Quarterly,* 13: 47–64.

Galbraith, J. 1973. *Designing complex organizations.* Reading, MA: Addison-Wesley.

Galbraith, J., & Kazanjian, R. K. 1986. *Strategy implementation: Structure, systems and process.* New York: West.

Gupta, A. K., & Govindarajan, V. 1984. Business unit strategy, managerial characteristics, and business unit effectiveness at strategy implementation. *Academy of Management Journal,* 27: 25–41.

Gupta, A. K., & Govindarajan, V. 1986. Resource sharing among SBUs: Strategic antecedents and administrative implications. *Academy of Management Journal,* 29: 695–714.

Griffin, R. W. 1980. Relationship among individual, task design, and leader behavior variables. *Academy of Management Journal,* 23: 665–683.

Hambrick, D. C., & Mason, P. A. 1984. Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review,* 9: 195–206.

Hamermesh, R. G., & White, R. E. 1984. Manage beyond portfolio analysis. *Harvard Business Review,* 62(1): 103–109.

Harrigan, K. R. 1983. *Strategies for vertical integration.* Lexington, MA: Lexington Books.

Hayes, R. H., & Abernathy, W. J. 1980. Managing our way to economic decline. *Harvard Business Review,* 58(4): 67–77.

HBS Case Services. 1979. *IBM Corporation: Bubble memory incident.* Boston: HBS Case Services.

Hill, C. W. L., Hitt, M. A., & Hoskisson, R. E. 1988. Declining U.S. competitiveness: Innovation, the M-form structure and the capital markets. *Academy of Management Executive,* 2(1): 51–60.

Hill, C. W. L., & Hoskisson, R. E. 1987. Strategy and structure in the multiproduct firm. *Academy of Management Review,* 12: 331–341.

Hitt, M. A., Ireland, R. D., & Palia, K. A. 1982. Industrial firms' grand strategy and functional importance: Moderating effects of technology and uncertainty. *Academy of Management Journal,* 25: 265–298.

Hoskisson, R. E. 1987. Multidivisional structure and performance: The contingency of diversification strategy. *Academy of Management Journal,* 30: 625–644.

Hoskisson, R. E., & Hitt, M. A. 1988. Strategic control systems and relative R&D investment in large multiproduct firms. *Strategic Management Journal,* 9: 605–621.

Internal Revenue Service. 1973–76. *Statistics of income: Corporate income tax returns.* Washington, DC: U.S. Government Printing Office.

Janis, I. L. 1972. *Victims of groupthink: A psychological study of foreign policy decisions and fiascoes.* Boston: Houghton Mifflin.

Katz, R. 1982. The effects of group longevity on project communication and performance. *Administrative Science Quarterly,* 27: 81–104.

Keats, B. W., & Hitt, M. A. 1988. A causal model of linkages among environmental dimensions, macro organizational characteristics, and performance. *Academy of Management Journal,* 31: 570–598.

Kerr, J., & Slocum, J. W., Jr. 1987. Managing corporate cultures through reward systems. *Academy of Management Executive,* 1(2): 99–107.

Kimberly, J. R. 1976. Organizational size and the structuralist perspective: A review, critique, and proposal. *Administrative Science Quarterly,* 21: 571–597.

Kotter, J. P. 1982. *The general managers.* New York: Free Press.

Labovitz, S. 1970. The assignment of numbers to rank order categories. *American Sociological Review,* 35: 515–524.

Lawrence, P. R., & Lorsch, J. W. 1967. *Organization and environment.* Boston: Division of Research, Harvard University Graduate School of Business Administration.

Leontiades, M. 1982. Choosing the manager to fit the strategy. *Journal of Business Strategy,* 3(2): 58–69.

Lorsch, J. W., & Allen, S. A. 1973. *Managing diversity and interdependence.* Boston: Division of Research, Harvard University Graduate School of Business Administration.

McCain, B. R., O'Reilly, C. A., & Pfeffer, J. 1983. The effects of departmental demography on turnover: The case of a university. *Academy of Management Journal,* 26: 626–641.

Miles, R. E., & Snow, C. C. 1978. *Organizational strategy, structure and process.* New York: McGraw-Hill.

Montgomery, C. A. 1979. *Diversification, market structure and firm performance: An extension of Rumelt's model.* Doctoral dissertation, Purdue University, West Lafayette, Indiana.

Montgomery, C. A. 1985. Product-market diversification and market power. *Academy of Management Journal,* 28: 789–798.

Moody's Investor Services. 1973. *Moody's Industrial Manual.* New York: Moody's Investor Services.

Norman, D. A. 1976. *Memory and attention.* New York: Wiley.

O'Reilly, C. A., III. 1977. Personality-job fit: Implications for individual attitudes and performance. *Organizational Behavior and Human Performance,* 18: 36–46.

O'Reilly, C. A., III, Caldwell, D. F., & Barnett, W. P. 1989. Work group demography, social integration, and turnover. *Administrative Science Quarterly,* 34: 21–37.

O'Reilly, C. A., III, & Flatt, S. 1989. *Executive team demography, organizational innovation and firm performance.* Working paper, University of California, Berkeley.

Ouchi, W. G. 1980. Markets, bureaucracies, and clans. *Administrative Science Quarterly,* 25: 129–141.

Pfeffer, J. 1983. Organizational demography. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior,* vol. 5: 299–357. Greenwich, CT: JAI Press.

Pitts, R. A. 1974. Incentive compensation and organization design. *Personnel Journal,* 53: 338–344.

Pitts, R. A. 1976. Diversification strategies and organizational policies of large diversified firms. *Journal of Economics and Business,* 28: 181–188.

Pitts, R. A. 1980. Toward a contingency theory of multibusiness organization design. *Academy of Management Review,* 5: 203–210.

Porter, M. E. 1985. *Competitive advantage.* New York: Free Press.

Prahalad, C. K., & Bettis, R. A. 1986. The dominant logic: A new linkage between diversity and performance. *Strategic Management Journal,* 7: 485–501.

Ravenscraft, D. J., & Scherer, F. M. 1987. *Mergers, sell-offs, and economic efficiency.* Washington, DC: Brookings Institution.

Roberts, K. H., & O'Reilly, C. A., III. 1979. Some correlates of communication roles in organizations. *Academy of Management Journal,* 22: 42–57.

Rogers, E., & Bhowmik, D. K. 1971. Homophily-heterophily: Relational concepts for communication research. *Public Opinion Quarterly,* 34: 523–538.

Rumelt, R. P. 1974. *Strategy, structure and economic performance.* Boston: Harvard University Press.

Rumelt, R. P. 1978. *Databank on diversification strategy and corporate structure.* Paper MGL-55, Managerial Studies Center, Graduate School of Business, University of California, Los Angeles.

Rumelt, R. P. 1982. Diversification strategy and profitability. *Strategic Management Journal,* 3: 359–369.

Scherer, F. M. 1980. *Industrial market structure and economic performance.* Chicago: Rand McNally.

Snow, C. C., & Hrebiniak, L. G. 1980. Strategy, distinctive competence, and organizational performance. *Administrative Science Quarterly,* 25: 317–336.

Song, J. H. 1982. Diversification strategies and the experience of top executives of large firms. *Strategic Management Journal,* 3: 377–380.

Staw, B. M. 1981. The escalation of commitment to a course of action. *Academy of Management Review,* 6: 577–587.

Szilagyi, A. D., & Schweiger, D. M. 1984. Matching managers to strategies: A review and suggested framework. *Academy of Management Review,* 9: 626–634.

Thompson, J. D. 1967. *Organizations in action.* New York: McGraw-Hill.

Tushman, M. L., & Nadler, D. A. 1978. Information processing as an integrating concept in organization design. *Academy of Management Review,* 3: 613–624.

Tushman, M., & Romanelli, E. 1985. Organizational evolution: A metamorphosis model of convergence and reorientation. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior,* vol. 7: 171–222. Greenwich, CT: JAI Press.

Vancil, R. F. 1979. *Decentralization: Managerial ambiguity by design.* New York: Financial Executives Research Foundation.

Wagner, G. W., Pfeffer, J., & O'Reilly, C. A., III. 1984. Organizational demography and turnover in top management groups. *Administrative Science Quarterly,* 29: 74–92.

Williamson, O. E. 1975. *Markets and hierarchies: Analysis and antitrust implications.* New York: Macmillan-Free Press.

Wrigley, L. 1970. *Divisional autonomy and diversification.* Doctoral dissertation, Harvard University Graduate School of Business Administration, Boston.

Zenger, T. R., & Lawrence, B. S. 1989. Organizational demography: The differential effects of

age and tenure distributions on technical communication. *Academy of Management Journal,* 32: 353–376.

APPENDIX
Diversification Categories

1. Unrelated: A firm's main business (those accounting for the most revenues) contributes less than 70 percent of its annual revenues, and other businesses are not related to the main business or to each other.
2. Related-linked: A main business contributes less than 70 percent of annual revenues, but at least 70 percent of annual revenues come from businesses related to each other but not directly related to the main businesses.
3. Related-constrained: A main business contributes less than 70 percent of annual revenues, but at least 70 percent of annual revenues come from businesses that are directly related to the main business.
4. Dominant-vertical: A firm derives between 70 and 95 percent of its annual revenue from a vertically integrated chain of activities.

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PEER REPORTING OF UNETHICAL BEHAVIOR: A SOCIAL CONTEXT PERSPECTIVE

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This research hypothesized that two social context conditions influence group members' evaluations of peer reporting of unethical behavior and their own inclination to report peers: the misconduct threatens the interests of group members and peer reporting is defined as a role responsibility of group members. Two scenario studies provided mixed support for the hypotheses, results differing in the two hypothetical settings. In both studies, however, when subjects perceived a peer re-. porter as highly ethical, they simultaneously evaluated him or her as unlikable. Results of a field survey provided some support for the generalizability of the findings to an actual work setting.

Unethical behavior, such as employee theft or fraud, can be extremely costly to organizations. For theft alone, recent estimates place the annual cost to U.S. business at over 40 billion dollars (Zemke, 1986). With increasing domestic and international competition, many firms view the reduction of such losses as critical to their survival. But unethical behavior may be particularly difficult for organizations to control (Tannenbaum, 1968). Control requirements in organizations depend on the cost and difficulty of monitoring employee behavior (Eisenhardt, 1989; Ouchi, 1979). When monitoring is difficult or costly, employees may take advantage of the opportunity to pursue self-interested behavior at the expense of an organization. Direct supervision cannot fully monitor employee behavior, particularly behavior that is purposely concealed from management. Thus, substitutes for and supplements to direct supervision may be needed.

Co-workers who are willing to monitor their peers' behavior and report violations to management represent a potentially important supplemental control resource for organizations. Work group members are more likely than supervisors to be aware of co-workers' misconduct. Therefore, manag-

ers who face persistent problems with misconduct like employee theft may wish to encourage work group members to report their peers. However, before attempting to influence peer reporting, these managers should be aware of the complex within-group pressures surrounding peer reporting. First, the social system within work groups can be expected to exert pressures that make peer reporting a proscribed and risky behavior. Generally, co-workers do not welcome the role of peer reporter. Group norms are likely to prohibit tattling and to prescribe severe consequences for tattlers (Greenberger, Miceli, & Cohen, 1987). These group pressures can be expected to reduce members' inclination to report a peer's misconduct. However, the same pressures that inhibit peer reporting may be functional for a group in that they protect group cohesion by fostering feelings of security and group loyalty (Shaw, 1971). Thus, managers attempting to influence the climate for peer reporting must take into account the complex social pressures surrounding this highly sensitive behavior and the potential impact on a group of any managerial influence attempt.

The social context within which peer reporting may occur can be represented as a conflict between opposing forces that pressure people to think and behave in different ways. For example, powerful group norms against tattling pressure group members not to report other group members and to evaluate those who do negatively. However, management may apply counter pressures, such as punishing all work group members for one individual's misconduct, or prescribing peer reporting through rules, policies, or prescribed work roles. We propose that a management can structure a work context to create pressures that will counter the powerful group pressures against peer reporting and positively influence individual workers' evaluations of peer reporting and their inclination to engage in that behavior.

This research investigated employees' inclination to report peers' misconduct and the evaluation of peer reporting within the complex context of socially defined rules, roles, norms, and reward systems. We assumed that individuals will adapt their attitudes, beliefs, and behaviors to the realities of their social contexts (Greenberger et al., 1987; Salancik & Pfeffer, 1978) and that managements can influence those social contexts. More specifically, we hypothesized two conditions expected to affect individual group members' evaluation of peer reporting and their inclination to engage in it.

THE DOMAIN OF PEER REPORTING

Peer reporting occurs when group members go outside their group to report a member's misconduct. The domain of peer reporting builds upon two overlapping research streams representing (1) whistle-blowing behavior and (2) group norm enforcement processes.

Whistle-blowing

Peer reporting can be conceptualized as a type of whistle-blowing, which Near and Miceli (1985) defined as "the disclosure of perceived

wrongdoing by organization members to parties who may be able to halt it."
Theoretically, whistle-blowing may include any attempt at extragroup or
extraorganizational control. However, research on whistle-blowing has fre-
quently focused on organizational wrongdoing and "upward" control efforts
(Graham, 1986) in which an organization member questions the judgment of
superiors and reports the questionable decision or action to organizational or
governmental authorities (Near, 1989). Peer reporting also involves the ob-
servation of wrongdoing by an organization member and reporting of that
wrongdoing. However, peer reporting only describes lateral control attempts
that occur when a group member discloses a peer's wrongdoing to authori-
ties outside the group.

Although we know little about the particular dynamics of peer-reporting
situations, we know that a group member who reports a peer's misconduct
to authorities outside the group can expect to encounter negative reactions.
Powerful group norms against tattling and concerns for continuing group
cohesiveness and trust can be expected to weigh against peer reporters and
decrease group members' inclination toward peer reporting (Greenberger et
al., 1987). In fact, these powerful group concerns suggest that members'
reactions to peer reporters may be even stronger and more emotional than
reactions to whistle-blowers who report on higher authorities outside an
immediate work group. Thus, peer reporting is a particularly difficult and
risky behavior. Peer evaluation of whistle-blowers also raises an intriguing
irony. Although a group may evaluate peer reporters as unlikable and see
their actions as unacceptable (Greenberger et al., 1987), peer reporters may at
the same time be seen as highly ethical. Research on moral psychology has
suggested that highly ethical persons will not be accepted and may even be
fated to martyrdom (Kohlberg, 1981).

Group Norm Enforcement

Peer reporting can also be considered a specific case of the general
process of group norm enforcement (Feldman 1984; Katz & Kahn, 1978).
Graham (1986) and Greenberger and colleagues (1987) have argued that
group-level factors may be important to understanding whistle-blowing be-
havior. Groups enforce a variety of norms—informal rules or standards de-
signed to guide member behavior. When norms are violated, a group may
enforce them with reprimands and other sanctions, such as ostracism or
expulsion from the group (Bales, 1958; Feldman, 1984). Groups have rules
about what is and is not misconduct and about appropriate responses to
misconduct. Because group loyalty is such an important group norm (Katz &
Kahn, 1978), groups can be expected to prefer handling misconduct them-
selves (Greenberger et al., 1987) and to react negatively when members ven-
ture outside to report misconduct (Graham, 1986). These negative group
member reactions may involve evaluation of peer reporters as unlikable and
evaluation of their behavior as unacceptable. Strong emotions may accom-
pany such cognitive reactions. Although we are not aware of specific re-
search on emotional reactions to whistle-blowing in general or to peer re-

porting specifically, we expected that negative emotions like anger would accompany group members' negative cognitive reactions to peer reporting.

SOCIAL CONTEXTS AND PEER REPORTING

The social context within an organization provides norms and expectations as well as rewards and punishments that can influence organization members' attitudes, beliefs, and behaviors. We propose that two social context conditions will affect group members' inclination to engage in peer reporting and their cognitive and emotional responses to it. These conditions involve the extent to which: (1) a group member's misconduct threatens the interests of other group members and (2) peer reporting is defined as an individual group member responsibility.

The Interests of Group Members

Near and Miceli (1985) suggested that group members may oppose whistle-blowing if they somehow benefit from overlooking misconduct. However, a peer's misconduct may not be particularly salient to work group members if it neither benefits nor hurts them. We propose that managements can structure reward systems in such a way that misconduct and its reporting become salient to all group members. The structure of group incentives has been shown to influence in-group relations and performance (McCallum et al., 1985; Rosenbaum et al., 1980). Further, research on ethical behavior has suggested that the structure of a reward system can significantly influence whistle-blowing behavior (Trevino & Youngblood, 1990).

Managements may structure reward systems so certain acts of individual group members threaten all group members' interests (Alchian & Demsetz, 1972). For instance, some organizations dock the pay of all workers for losses due to employee theft (Feinstein, 1990). This shared group consequence is highly salient to all group members and may serve to weaken the norm against reporting a group member's misconduct to management. Stealing may come to be viewed as stealing from peers rather than from the organization and become defined as an act against the group rather than against the organization. Peer reporting may then be redefined as a way of protecting the group and its interests rather than as a way of harming the group. Thus, where incentives are so structured that other group members share the consequences of a group member's misconduct, peer reporting behavior and peer reporters should be evaluated more positively by group members, and group members should be more inclined to report peers.

Our hypotheses distinguish between group members' perceptions of peer reporters and their actions because it is possible for observers to believe that peer reporters "did the right thing" without liking them for it (Kohlberg, 1981). The hypotheses also distinguish between cognitive and emotional reactions because we expected emotional reactions to accompany cognitive evaluations of peer reporting. Finally, the hypotheses rest on an assumption that group members are aware of peer-reporting acts.

Hypothesis 1a: When a group member's behavior threatens the interests of other group members, they are more likely to evaluate peer reporting as acceptable.

Hypothesis 1b: When a group member's behavior threatens the interests of other group members, they are more likely to evaluate a peer reporter positively.

Hypothesis 1c: When a group member's behavior threatens the interests of other group members, they are less likely to express a negative emotional reaction to peer reporting.

Hypothesis 1d: When a group member's behavior threatens the interests of other group members, they will be more inclined to engage in peer reporting.

Role Responsibility

Graham (1986) proposed that feelings of personal responsibility are important determinants of whistle-blowing behavior. Miceli and Near (1984) suggested that whistle-blowing is sometimes prescribed for individuals in certain roles. A recent survey of internal auditors found that whistle-blowing was more likely when auditors saw reporting as prescribed. Thus, an important influence on people's inclination to peer report may be the extent to which peer reporting is perceived to be a part of their role (Miceli, Near, & Schwenk, 1989).

Managements can influence perceptions of role responsibility within particular organizational contexts by specifying role responsibilities and expectations. Group members may then use these to judge their own and others' actions (Hamilton & Sanders, 1981; Hart, 1968; Katz & Kahn, 1978; Kelman & Hamilton, 1989; Maclagan, 1983; Schwartz, 1968). Sociocultural systems within organizations influence member beliefs about role responsibilities (Graen, 1983). Organizational codes of ethics represent management efforts to influence organization members' perceptions of role responsibilities. Some codes define peer reporting as a group member responsibility (Murphy, 1989), mandating going outside a group to report a group member's misconduct. For instance, a number of business organizations provide hot lines that allow organization members to communicate concerns about misconduct they have observed (General Dynamics Corporation, 1988). "Nontoleration clauses" in the U.S. military service academies' honor codes are examples of required role responsibility for peer reporting. In these cases, group members are responsible for monitoring the behavior of their peers and reporting misconduct to designated authorities. We propose that group members will evaluate peer reporters and their behavior more positively and will be more inclined to engage in that behavior when a conduct code defines it as a role responsibility of group members.

Hypothesis 2a: When peer reporting is defined as a role responsibility of group members, they are more likely to evaluate it as acceptable.

Hypothesis 2b: When peer reporting is defined as a role responsibility of group members, they are more likely to evaluate a peer reporter positively.

Hypothesis 2c: When peer reporting is defined as a role responsibility of group members, they are less likely to express a negative emotional reaction to peer reporting.

Hypothesis 2d: When peer reporting is defined as a role responsibility of group members, they will be more inclined to peer report.

SCENARIO STUDIES METHODS

The hypotheses were first tested in two scenario studies representing two different contexts in which peer reporting might occur: academic cheating, and employee theft in a fast-food restaurant. Appendix A gives the texts of the scenarios. Both experiments had two-by-two factorial designs with scenarios manipulating one factor relating to the interests of group members and a second relating to role responsibility. In both experiments, subjects were asked to assume the role of a group member who becomes aware that another group member has gone outside the group to report the misconduct of a third group member. We measured subjects' reactions to peer reporting and the peer reporter in addition to their thoughts about what they would do under similar conditions. We used multivariate and univariate analysis of variance (MANOVA and ANOVA) procedures to test the influence of the two conditions on the dependent variables. We also used qualitative content analysis techniques (Miles & Huberman, 1984) to analyze responses to optional open-ended questions systematically.

Scenario Study One: Academic Cheating

Subjects. We recruited 478 upper-division undergraduate students from large classes in a college of business. Participation was voluntary and occurred during class time. No incentive was provided. Most participants indicated that they were seniors (334); 140 said they were juniors; and 4 did not designate class. The subjects' mean age was 21, and there were 270 men and 208 women. Subjects were randomly assigned to the four conditions described below.

Design. For this study, we defined peer reporting as reporting a peer's cheating on a final exam. We manipulated the first factor, the interests of group members, by stating either that exam grades were based on a curve so that cheating affected all students' grades or that grades were based on objective criteria, so that cheating did not affect others' grades. We manipulated the second factor, role responsibility, by stating either that an honor

code governed student responsibility for reporting peer cheating or that the professor was responsible for monitoring cheating.

Measures. Four items on the questionnaire served as a manipulation check. Rated on a seven-point Likert scale ranging from "strongly disagree" to "strongly agree," the items asked whether grades in the course were: (1) based on a curve or (2) based on standard criteria and (3) whether students or (4) faculty members were responsible for proctoring the exam.

Subjects were asked to respond to a number of questionnaire items that asked them to imagine being Pat's (the peer reporter's) classmate. We developed and refined these measures through pilot testing. Qualitative data were also collected in the form of voluntary responses to open-ended questions about subjects' thoughts and feelings and the reasons for their decisions.

The first measure focused on reactions to the peer reporter's behavior: "As a classmate, I think Pat's behavior, telling the professor about the cheating incident was: right/wrong, unjust/just, fair/unfair, appropriate/inappropriate, acceptable/unacceptable, selfish/unselfish, tattling/not tattling." A high score represented an evaluation of the behavior as acceptable. Cronbach's alpha was .89.

The second and third measures asked subjects to evaluate the peer reporter in terms of ethicality and likability. Subjects answered the question "As a classmate, what do you think about Pat as a person?" on two five-item, seven-point bipolar scales: "ethical/unethical, bad/good, strong/weak, dishonorable/honorable, and admirable/not admirable" (α = .84). A high score on this measure represents an evaluation of Pat as ethical. The items for the likability measure included: "selfish/unselfish, like me/not like me, group-oriented/self-oriented, tattletale/not tattletale, and likable/not likable" (α = .82). A high score on this measure represents an evaluation of Pat as unlikable.

Subjects were also asked to describe their emotional reactions to the reporting behavior. "As a classmate, what would your feelings be if you knew that Pat had told the professor about the cheating?" On a three-item, seven-point scale ranging from "not at all" to "very," subjects rated the extents to which they were angry, annoyed, and sad (α = .80). A high score on this measure represents a more intense negative emotional response.

Finally, to evaluate the extent of subjects' inclination to engage in peer reporting, we asked them to consider how they would behave in the same situation. Subjects responded to "I would report the cheater" on a seven-point scale ranging from "strongly disagree" to "strongly agree."

Scenario Study Two: Fast-Food Theft

Subjects. We recruited 115 students with work experience at fast-food restaurants from upper-division classes in a college of business. No incentive was provided for participation. Subjects included 61 men and 54 women with a mean age of 21 and a mean of 13 months experience working in a fast-food restaurant.

Design. For this study, we defined peer reporting as reporting a co-worker's stealing frozen pizzas from a restaurant. We manipulated the first

factor, the interests of group members, by stating in scenarios that the employer either docked each group member's pay equally to compensate for losses due to theft or did not do so. We manipulated the second factor, role responsibility, by stating that group members had either agreed to take responsibility for reporting theft or that supervisors were considered responsible for monitoring theft.

Measures. As in study one, four items served as a manipulation check. Subjects were asked whether every worker's pay was (1) affected by losses found during inventory or (2) not affected and (3) whether co-workers or (4) supervisors were responsible for monitoring and reporting food theft (seven-point scale, "strongly agree" to "strongly disagree").

The items used to measure reactions to the peer reporter and his or her behavior were identical to those used in the academic cheating study described above, with the item stems altered to reflect the restaurant context. Cronbach's alphas were as follows: acceptability, .87; ethicality, .83; unlikability, .84; and negative emotions, .79.

Finally, to measure subjects' inclination toward peer reporting, we asked them to respond to the following item: "I would report the thief" (seven-point scale, from "strongly disagree" to "strongly agree").

RESULTS OF SCENARIO STUDIES

Study One

Results indicated that subjects correctly perceived the manipulated conditions. Analysis of variance tests for the influence of the conditions on the manipulation check questions were statistically significant, and patterns of means were in the expected direction. Appendix B gives manipulation check results.

Table 1 reports means, standard deviations, and intercorrelations for the variables used in the academic cheating scenario study, and Table 2 reports means for the dependent measures under the four conditions. The hypotheses predict that the interests of group members and role responsibility will influence reactions to a peer reporter as a person and to the peer-reporting behavior. MANOVA results indicated no significant interactions between

TABLE 1
Summary Statistics, Scenario Study One: Academic Cheating[a]

Variables	Means	s.d.	1	2	3	4
1. Acceptability	4.62	1.31				
2. Ethicality	2.69	1.13	−.65			
3. Unlikability	4.28	1.26	−.74	.69		
4. Negative emotions	2.78	1.45	−.66	.53	.60	
5. Inclination to report	3.14	1.80	.68	−.47	−.61	−.49

[a] All correlations are statistically significant at $p < .0001$. $N = 478$.

TABLE 2
Means and Standard Deviations of the Dependent Measures, Scenario Study One: Academic Cheating[a]

Conditions	Acceptability		Ethicality		Unlikability		Negative Emotions		Inclination to Report	
	Means	s.d.	Means	s.d.	Means	s.d.	Means	s.d.	Means	s.d.
Conduct code, grade curve	4.97	1.20	2.62	1.12	4.13	1.23	2.49	1.28	3.69	1.93
Conduct code, no grade curve	4.90	1.17	2.42	0.99	4.00	1.16	2.71	1.39	3.29	1.82
No conduct code, grade curve	4.50	1.38	2.73	1.15	4.37	1.32	2.77	1.53	2.91	1.70
No conduct code, no grade curve	4.28	1.31	2.83	1.15	4.49	1.27	3.11	1.50	2.62	1.54

[a] $N = 453$; 25 cases were rejected because of missing data.

the interests factor and the role responsibility factor (Wilks's lambda = .996, $F_{4,459}$ = .49, p < .78). However, there were significant main effects for both interests of group members (Wilks's lambda = .979, $F_{4,459}$ = 2.35, p < .053) and role responsibility (Wilks's lambda = .951, $F_{4,459}$ = 5.90, p < .0001).

The univariate analysis of variance tests for the influence of role responsibility on acceptability of the peer-reporting behavior, the ethicality and likability of the peer reporter, and negative emotional reactions to the peer reporting were all statistically significant. When an established code of conduct made peer reporting a role responsibility for group members, subjects considered peer reporting to be more acceptable, perceived the reporter to be less ethical and more likable, and had fewer negative emotional reactions to the peer-reporting act. These findings are consistent with Hypotheses 2a, 2b, and 2c. However, results of the ANOVA tests for the influence of the interests of group members were nonsignificant except for a marginally significant influence on negative emotional response. When grades were curved, subjects reported a less negative emotional response to peer reporting than when they were not. Thus, Hypotheses 1a and 1b were not supported, and Hypothesis 1c was marginally supported in the academic cheating context. Table 3 summarizes the results of the ANOVAs for these variables.

We also hypothesized that the interests of group members and role responsibility would influence subjects' inclination to engage in peer reporting under the same circumstances. An analysis of variance found statistically significant main effects for both role responsibility and the interests of group members. Subjects were more inclined to report a peer when (1) the peer reporter role was defined as a role responsibility within the group via an accepted code of conduct mandating the reporting of cheaters, and (2) group members shared the consequences of the misconduct via curved grades (see Table 3).

TABLE 3
Results of Univariate Analyses of Variance, Scenario Study One:
Academic Cheating

Dependent Measures	Conditions	
	Grade Curve in Scenario	Conduct Code in Scenario
Acceptability[a]	1.88	23.46**
Ethicality[a]	0.19	7.48*
Unlikability[a]	0.01	11.44**
Negative emotions[a]	3.75†	8.70*
Inclination to report[b]	4.54*	19.56**

[a] $df = 1,462$.
[b] $df = 1,456$.
† p < .10
* p < .05
** p < .01

Responses to the optional open-ended questions were provided by 67 subjects. To analyze these qualitative data, we conducted a systematic content analysis (Miles & Huberman, 1984). We first divided the responses into word groups representing single thoughts that could stand alone. Responses relevant to each thought were transferred from the surveys, typed onto separate sheets of paper, and treated as individual "data points." We then developed codes for organizing these word groups into 19 categories that would represent the data. Two categories were dropped because they had fewer than five entries in each study. Thus, 17 categories represent the qualitative data. Table 4 lists the categories and response frequencies.

Intercoder reliability for the academic cheating qualitative data was checked by giving three research assistants the data and the original 19 categories and asking them to assign the code that fit best. For 52 percent of the word groups, the three coders' categorizations were in complete agreement. For 41 percent of the word groups, two of the three coders agreed. There was no agreement among the coders on 7 percent of the academic cheating qualitative data. Where there was no agreement among raters, we excluded the data from subsequent analysis.

First, the qualitative analysis provided additional confidence that the manipulations had worked. Subjects whose scenarios said that a conduct code mandated peer reporting were much more likely to state that it was Pat's responsibility to report the observed misconduct (category 3). Subjects in these two conditions made 33 references to Pat's responsibility for reporting; examples of responses included "She is taking responsibility for enforcing the honor code for herself and her classmates," "There is an honor system because the university believes in the students," and "The responsibility is in the students." Subjects in the other two conditions made only three such references. Similarly, subjects whose scenarios said that grades were on a curve were much more likely to say that cheating hurt other members of the group (category 2) than were those in the other two conditions with 33 references versus 10 references. Examples were "It would not be fair to the other students who did not cheat if the cheater did well," and "If the professor grades on a curve, the person cheating could get a very high score. When Pat told the professor, she protected not only herself but her classmates also."

On the other hand, an almost equal number of subjects in each condition argued that it should not be Pat's responsibility to monitor classmates (category 4): "It shouldn't be up to the students to tell on one another." Across the four conditions, the number of comments in this category ranged from 23 to 31. Some subjects felt that the faculty member was being lazy or irresponsible: "The faculty member shouldn't be so lazy as to not proctor the exam," "It was . . . the professor's job to do that," and "It is the faculty members' responsibility to be sure his exam is administered and taken fairly. Students should be able to put their full efforts into taking an exam without having to worry about someone else cheating." These comments may relate to stu-

TABLE 4
Qualitative Response Frequencies by Category and Condition, Scenario Studies

Response Categories	Study One: Academic Cheating Conditions				Study Two: Fast-Food Conditions			
	Conduct Code and Grade Curve	None	Grade Curve	Conduct Code	Conduct Code and Pay Dock	None	Pay Dock	Conduct Code
1. Pat should confront the co-worker	3	1	0	2	5	2	7	6
2. I am hurt and/or others are hurt by stealing, cheating	28	1	9	5	13	3	12	4
3. It's Pat's responsibility to tell	20	1	2	13	3	0	3	5
4. It's not Pat's responsibility to tell	23	31	28	31	0	2	1	2
5. Telling is right, ethical, honest	27	7	14	14	7	4	5	15
6. Telling is difficult to do	7	4	4	8	5	0	4	3
7. Expressions of dislike for Pat	6	12	12	10	2	9	3	4
8. Concern about relationships with the violator and others in the group	1	1	0	0	5	0	1	2
9. The violator broke the rules and must take the consequences	6	0	2	7	2	1	2	2
10. You have to take the circumstances into account	1	1	1	2	3	2	2	3
11. Awareness of the norm against tattling and fear of retailiation	11	0	5	3	2	2	2	10
12. Tattling could harm group trust and cohesion	1	2	1	7	0	1	4	1
13. The supervisor's/teacher's ability to trust workers/students important	1	0	0	2	5	0	1	3
14. I wouldn't (or didn't) report a peer	9	2	8	7	2	1	1	3
15. Cheating/stealing is wrong	4	4	5	4	1	5	1	4
16. I have no opinion, I can't tell, it doesn't affect me	0	0	2	0	1	1	0	2
17. Everyone does it. It's easy, understandable, human nature	6	3	2	6	3	2	5	3

dents' own experience under a local university honor system that does not require peer reporting. Another comment was "Students in general are not responsible for others' actions in an honor system."

In addition, the qualitative data suggest that the experimental conditions influenced perceptions of peer-reporting norms and pressures. Subjects who read the scenario in which the honor code and grade curve figured were much more likely to make comments suggesting that peer reporting was the right thing to do (category 5). They were also less likely to voluntarily express dislike for Pat (category 7). Subjects in the no code–no grade curve condition were the least likely of the four subject groups to suggest that peer reporting was right and were more likely to express dislike for Pat. These subjects were also least likely to say that the violator broke the rules and must take the consequences (category 9). Subjects' recognition of the difficulty of peer reporting was also captured in their open-ended responses. Although subjects in the three other conditions were more likely to say that peer reporting was right, they were also more likely to discuss the norm against tattling (category 11) and to admit that they wouldn't report a peer themselves (category 14). Thus, the experimental conditions seemed to raise subjects' awareness of and sensitivity to the conflicting pressures that operate in a peer-reporting situation. Subjects seemed to be aware of the difficulty of actually following through on reporting a peer.

Study Two

Results of the quantitative data analysis again suggested that subjects correctly perceived the manipulated conditions. The analysis of variance tests for the influence of the conditions on the manipulation check questions were statistically significant, and the patterns of means were in the expected direction (see Appendix B). Table 5 reports means, standard deviations, and intercorrelations, and Table 6 gives means for the dependent measures under the four experimental conditions. The hypotheses predict that the interests of group members and group norms will influence reactions to a peer reporter and to peer-reporting behavior. Multivariate analysis of variance indicated no significant interactions between group interests and role responsibility (Wilks's lambda = .980, $F_{4,106}$ = .53, $p < .714$) and no significant main effect for role responsibility (Wilks's lambda = .959, $F_{4,106}$ =

TABLE 5
Summary Statistics, Scenario Study Two: Fast-Food Theft[a]

Variables	Means	s.d.	1	2	3	4
1. Acceptability	4.96	1.32				
2. Ethicality	2.34	1.08	−.59			
3. Unlikability	3.72	1.40	−.76	.64		
4. Negative emotions	3.05	1.50	−.62	.40	.63	
5. Inclination to report	3.98	1.88	.65	−.45	−.58	−.56

[a] All correlations are statistically significant at $p < .0001$; N = 115.

TABLE 6
Means and Standard Deviations of the Dependent Measures, Scenario Study Two: Fast-Food Theft[a]

Conditions	Acceptability		Ethicality		Unlikability		Negative Emotions		Inclination to Report	
	Means	s.d.	Means	s.d.	Means	s.d.	Means	s.d.	Means	s.d.
Conduct code, pay dock	5.32	1.28	1.96	0.96	3.28	1.33	2.66	1.39	4.61	1.60
Conduct code, no pay dock	4.98	1.27	2.58	1.07	3.69	1.24	3.34	1.54	4.03	1.87
No conduct code, pay dock	5.14	1.08	2.24	1.06	3.60	1.35	2.88	1.31	3.85	1.81
No conduct code, no pay dock	4.46	1.52	2.59	1.31	4.20	1.54	3.43	1.67	3.44	2.15

[a] $N = 112$; 3 cases were rejected because of missing data.

1.15, $p < .339$). However, there were marginally significant main effects for group interests (Wilks's lambda $= .929$, $F_{4,106} = 2.04$, $p < .094$).

Results of the univariate analysis of variance tests suggested that, when group interests were threatened—when co-workers had their pay docked for documented food theft losses—subjects had less negative emotional reactions to the peer reporting, supporting Hypothesis 1c. Subjects whose scenarios included pay docking also evaluated the peer reporter as less ethical than did those whose scenarios did not include docking. The influence of group interests on the acceptability of peer reporting and the likability of the peer reporter provided marginal support for Hypotheses 1a and 1b. Role responsibility also produced marginal support for Hypothesis 2b, regarding likability of the peer reporter. Table 7 summarizes ANOVA results.

It was also hypothesized that the structure of group interests and role responsibility would influence subjects' inclinations to report peers under the same circumstances. The ANOVA results indicated a marginal main effect for role responsibility (Hypothesis 2d) but no significant effect for the interests of group members (Hypothesis 1d).

A systematic content analysis was also conducted on the responses to the optional open-ended questions provided by 59 respondents (see Table 4 for response frequencies). Intercoder reliability for the fast-food scenario qualitative data was as follows: for 57 percent of the word groups, the three coders' categorizations were in complete agreement; for 39 percent, two of the three coders agreed; and for 4 percent, there was no agreement among the coders, so we excluded the data.

Content analysis of the optional qualitative data from this study also suggested that the manipulations worked. For example, respondents in the two conduct code conditions made eight references to the fact that reporting a peer was Pat's responsibility (category 3). An example was "If the workers had taken responsibility to report any violations, then it was Pat's responsibility. He did what he had to do." Under the no code–no pay-docking

TABLE 7
Results of Univariate Analyses of Variance, Scenario Study Two: Fast-Food Theft

Dependent Measures[a]	Conditions	
	Docked Pay in Scenario	Conduct Code in Scenario
Acceptability	3.58†	2.56
Ethicality	5.59*	0.65
Unlikability	3.11†	3.17†
Negative emotions	5.42*	0.18
Inclination to report	1.76	3.37†

[a] $df = 1,109$.
† $p < .10$
* $p < .05$

condition, the only references to responsibility were made by two respondents who claimed that it was not the group member's responsibility to report a peer (category 4): "It's not his job to supervise."

Similarly, respondents whose scenarios included pay docking were much more likely to justify peer reporting on the basis that theft would hurt members of the group (category 2), mentioning this theme 25 times while the other subjects mentioned it only 7 times. Examples were "Because one person stealing hurts everyone," "He did what was expected of him and saved some of his co-workers some money and trouble," "All [workers], including Pat, would be docked for the actions of this worker," and "He's looking out for all the workers, including me, when he tells on our co-worker."

Subjects in this study made fewer comments than the subjects reading the academic cheating scenarios suggesting that it was the supervisor's, not the employee's, responsibility to monitor and report misconduct (category 4). In fact, there were fewer comments about responsibility than about who would be hurt, supporting the idea that pay docking was a highly salient consequence in this study. Subjects whose scenarios included the conduct code only were most likely to volunteer comments suggesting that reporting was the right thing to do, making 15 comments in category 5. As in study one, subjects whose scenarios included both an honor code and group consequences were least likely to express dislike for Pat, the peer reporter (category 7). The no code—no pay-docking condition produced the most expressions of dislike for Pat. Finally, in this study, awareness of the norm against tattling (category 11) produced the most responses when only the conduct code figured in scenarios.

FIELD SURVEY METHODS

The evaluation of peer reporters and the inclination to engage in peer reporting (Hypotheses 1b, 1d, 2b, and 2d) were again investigated via a field survey of employees in a single region of a large fast-food restaurant chain, a setting similar to that created in the second scenario study. Because the organization imposed limitations on the number of survey items we could use, we chose to test the two hypotheses we believed to be most important.

In this organization, all of the restaurants require new employees to read and sign a code of conduct that identifies giving away or taking food as a serious problem that can result in disciplinary action. The code also encourages employees to identify violators of the code. These restaurants vary in the type and severity of discipline they impose for food theft.

Data

Respondents were 128 employees in 24 corporate-owned fast-food restaurants, of whom 36 percent were men and 59 percent were women. Ages ranged from 16 to 61 years, with a mean of 24. The average number of years of schooling was 12.4. The company had employed 31 percent of the respondents for more than a year. The rest had been with the company for less

than a year. According to our contact from the organization's human resources department, the respondents' demographic characteristics were representative of the population working in these restaurants.

Procedures

The questionnaire, which we designed, was administered to employees on-site at each restaurant by corporate district managers unknown to the respondents. Surveys are routinely administered in this way in this organization. We conducted a training session for the district managers and prepared written instructions for them and for the respondents so that surveys would be administered in a uniform manner. Respondents were told that the survey was voluntary and was being conducted by university researchers. Care was taken to protect the anonymity of responses. Respondents did not identify themselves on the survey, sealed completed surveys in an envelope addressed to us, and returned them to a larger envelope provided for that purpose. No one overtly refused to participate in the study. However, we had to eliminate ten survey protocols in which responses suggested refusal to participate in the study (details appear under "Analysis").

Measures

Independent variables. The field survey did not depend on scenarios to create the independent variable conditions. Rather, questionnaire items measured the extent to which group interests and role responsibility were influential. We measured the two variables by single items asking the extent to which a respondent agreed that (1) other employees in a crew are hurt when an employee takes or gives away an order of french fries and (2) other crew members are responsible for making sure food is not taken or given away. Both items had seven-point scales anchored by "strongly disagree" and "strongly agree."

Dependent variables. The dependent variable was measured via a single item that asked whether a respondent would be likely to report to the manager seeing another crew member taking or giving away an order of french fries. We used this small amount of food at management's request because they viewed this behavior as common and problematic in their organization. This variable was also rated on a seven-point scale from "strongly disagree" to "strongly agree." The second dependent variable related to evaluation of the peer reporter. Respondents were asked, "Imagine that a member of your crew told the manager that someone took or gave away a regular fry. What would other members of the crew think about the person who reported it?" This variable was measured on the following five-item bipolar scale: "proper/improper; strong/weak; team player/outcast; friendly/unfriendly; like everyone/different" (α = .90). A high score indicates a more negative evaluation of the peer reporter.

Analysis

Because of significant correlations among the dependent variables (see Table 8), we conducted a canonical correlation analysis with the role re-

sponsibility and interests of group members variables as the independent
variables and the propensity to report a peer and evaluation of a peer re-
porter as the dependent variables. Significant omnibus test results allowed
for the testing of individual hypotheses using simple linear regressions.

Several respondents circled the same Likert-scale number all the way
down a page, possibly indicating refusal to participate in the study. There-
fore, we developed a systematic check for consistency of responses, elimi-
nating protocols from the analysis if a respondent had assigned identical
responses to items that should have received opposite responses. For exam-
ple, a protocol was eliminated if responses suggested that peer reporting was
at the same time highly wrong and highly proper. We eliminated 10 proto-
cols as a result of this consistency check, leaving 118 surveys. Within the
analyses, the sizes of data sets vary because of missing data.

FIELD SURVEY RESULTS

Table 8 reports correlations among the study variables. The canonical
correlation resulted in a significant multivariate model (Wilks's lambda =
.896, $p < .029$). Table 9 presents the statistically significant results of a
regression analysis examining expected peer reporting. Both the role respon-
sibility and interests of group members variables significantly and positively
influenced the extent to which respondents agreed that they would report
the theft of an order of french fries to the manager. Thus, results supported
Hypotheses 1d and 2d. A second regression analysis, also reported in Table
9, examined evaluation of the peer reporter. A significant, negative relation-
ship emerged for role responsibility (Hypothesis 2b) but not for interests of
group members (Hypothesis 1b). Respondents evaluated the peer reporter
less negatively when perceptions of role responsibility for peer reporting
were high. Table 9 reports these results.

In an attempt to provide additional validity to the field study findings,
we returned to the field site six months after the initial data collection to
collect additional data from restaurant managers who had been managing

TABLE 8
Summary Statistics, Study Three: Field Survey[a]

Variables	Means	s.d.	1	2	3	4
1. Role responsibility	4.96	2.15				
2. Interests of group members	4.41	2.44	.26**			
3. Expected peer reporting	4.10	2.19	.42***	.34***		
4. Negative evaluation of peer reporter	4.70	1.60	−.28**	−.09	−.39***	

[a] $N = 107–115$.
** $p < .01$
*** $p < .001$

TABLE 9
Results of Regression Analysis, Study Three: Field Survey

Independent Variables	Expected Peer Reporting			Evaluation of Peer Reporter		
	β	t	p	β	t	p
Interests of group members	.24	2.62	.01	−.03	−0.26	n.s.
Role responsibility	.35	3.46	.001	−.26	2.50	.01
Adjusted R^2	.217			.051		
F	14.96			3.74		
df	2,99			2,99		
p	.0001			.027		

the surveyed restaurants at the time of the original survey. Because of changes in restaurant management, only 13 managers from the original 24 restaurants could be surveyed for this purpose. We asked those 13 individuals to think back to the period in question and report the extent to which members of their work crews had actually reported misconduct. Specifically, they were asked, "How often did someone working for you actually report that another crew member was taking or giving away food?" We then went back to our original work group data and found means for the independent variables and for inclination to report for each restaurant. We correlated these restaurant-level data with managers' recall of actual peer reporting. For interests of group members the correlation was .57 (p < .05), and for role responsibility it was .03 (n.s.). Despite the extremely small sample (N = 13) and expected slippage due to the passing of time and data aggregation, these data provide some additional support for a relationship between employee perceptions of the peer-reporting context and actual behaviors. The correlation between average inclination to report and managers' recall of actual peer reporting was reasonably strong and positive (r = .31). Although the correlation was not statistically significant, we are not sure of the value of examining statistical significance in such a small group.

DISCUSSION

This research hypothesized that managements can structure organizational contexts to affect employees' inclination to report peers' misconduct and their evaluation of peer reporters and peer reporting. With regard to the inclination to report, the results of all three studies supported the hypothesized influence of role responsibility. When an established code of conduct made peer reporting the responsibility of group members, people stated that they were more inclined to engage in that behavior. Two of the three studies—the academic cheating scenario study and the fast-food field survey— also supported the hypothesized relationship between the interests of group members and the inclination to report peers. Where other group members suffered negative consequences as a result of an individual's misconduct, people were more likely to state that they were inclined to report peers'

misconduct. Across all three studies, the effects were stronger for role responsibility than for group interests. Role responsibility may be more influential because it allows workers to feel some degree of personal control over their own peer-reporting behavior. Alternatively, managements that impose consequences on group members for others' misconduct may be viewed as authoritarian, controlling, and unfair.

Findings also supported the influence of the independent variables on the evaluation of peer reporters. However, these findings differed across the studies. Role responsibility had the greater influence on evaluation in the academic cheating scenario study and in the field survey, but the interests of group members dominated the effects in the fast-food scenario study. Differences in the structures of the peer-reporting contexts may account for these results.

In the fast-food scenario study, docked pay was a severe and highly salient group-level consequence. In the other contexts, the group-level consequences were not as concrete or as salient. For example, in the academic cheating context, subjects faced a more abstract consequence—the potential for somewhat lower grades. In the field setting, explicit penalties for theft were more likely to be perceived as individual penalties for a violator rather than as group-level penalties for all crew members. Thus, observers appear to evaluate a peer reporter less negatively when a structure imposes severe consequences on other group members. In these situations, people view a peer reporter as helping the group rather than as tattling on a co-worker, as responses like "Because one person stealing hurts everyone," and "He did what was expected of him and saved some of his co-workers some money and trouble" indicated. Role responsibility significantly influenced evaluation of peer reporters in both the academic cheating scenario study and in the field survey, where the group-level consequence was less salient than it was in the fast-food scenario study.

An intriguing finding from the scenario studies was the relationship between the perceived ethicality and likability of a peer reporter and the acceptability of peer reporting. Perceived ethicality was significantly and negatively correlated with the acceptability of peer reporting and significantly and positively correlated with a negative emotional reaction and an evaluation of Pat as an unlikable person. A clear pattern across the two scenario studies suggests that when subjects considered peer reporting to be less acceptable, they considered the peer reporter's behavior to be significantly more ethical. In addition, subjects who evaluated Pat as especially ethical simultaneously expressed more dislike for him or her and reported a more negative emotional reaction than other subjects. Thus, it appears that people who report a peer in the absence of defined and accepted norms are viewed as more ethical than they would be considered to be if they performed the same deed in a context in which such norms exist. At the same time, the peer reporter who is perceived to be more ethical is susceptible to the dislike of and rejection by other group members: "I think Pat is a snake for telling on him (even if it may be the right thing to do)." This finding is

consistent with evidence from the moral psychology literature (Kohlberg, 1981) suggesting that highly ethical people often face rejection. Future research may wish to investigate the circumstances under which observers view ethical behavior as unambiguously admirable and good and those in which they see it as narrowly moralistic. Alternatively, when peer reporting is an accepted behavior in a group—when it is consistent with the interests of group members or adopted as a group member responsibility—ethicality may become a less relevant dimension for evaluating behavior. Peer reporting becomes the norm and ceases to be considered an especially ethical behavior. The peer reporter is simply doing what is expected.

Limitations and Implications for Future Research

Results of the three studies provide mixed support for the hypotheses. In the scenario studies, the methodology and the range of contexts limit the generalizability of the results. Although the subjects seemed to have placed themselves in role, they were not in a real situation with real consequences like ostracism from the group. In any scenario study, the level of subject involvement in the situation is limited. However, this limited involvement should operate to reduce the subjects' responsiveness to the manipulations, suggesting that significant study results may be considered more robust. Further, the academic cheating scenario is closely related to these subjects' current experience, and the subjects for the fast-food theft scenario study had an average of more than a year of relevant work experience. Respondents who provided the optimal qualitative responses frequently referred to their own experiences working in fast-food restaurants, with statements like "Having worked in a fast-food restaurant, I know that theft is a problem."

Our focus on attitudes, emotions, and inclinations to report rather than on actual peer-reporting behavior limits the findings of all three studies. However, attitudes, emotions, and inclinations are interesting phenomena worthy of investigation in themselves. Group members' attitudinal and emotional responses represent important reactions to peer reporting. Additionally, the study of attitudes and intentions has been central to recent cognitive approaches to understanding such organizational behaviors as motivation and voluntary leaving (Fishbein & Ajzen, 1975; Locke & Latham, 1990; Steel & Ovalle, 1984; Tubbs & Ekeberg, 1991). Fishbein and Ajzen posited that intentions follow from attitudes and group norms and are key to predicting behavior. Many studies have supported the relationship between intentions and behavior, although the degree of association found in field research has been smaller than that reported in laboratory studies (Fishbein & Ajzen, 1975; Steele & Ovalle, 1984).

The voluntary qualitative responses suggested that the subjects in the scenario studies were aware of the difference between their inclinations and likely action. Although some individuals believed that they would feel compelled to report a peer's misconduct ("If he [Pat] didn't do it, I would have to, but it's better him than me"), more respondents acknowledged that, although it was right, it would be very difficult for them to report a peer ("It's

probably right, but I wouldn't do it" and "I personally would not feel comfortable doing this").

The additional field data collected from managers suggested some additional support for the external validity of the results. However, despite multiple attempts to demonstrate external validity, we are left with questions about the relationship between the hypothesized variables and actual behavior. Clearly, more research is needed to determine the influence of these variables on actual peer reporting and, in particular, the relationship between inclinations and actual behavior.

Another limitation is that self-reports are subject to social desirability bias. Therefore, it is possible that subjects who said that they would be inclined to peer report would not do so. However, the qualitative data from the scenario studies suggested that respondents were aware of the in-group pressures against peer reporting. They talked about how hard it would be to report a peer: "The hardest part is dealing with feelings of friends and co-workers .... It's the basic peer pressure situation" and "I am not sure, however, that everyone would do the same if they were in his position. It takes guts!"

This research also raises questions about the ethicality of creating a work context that supports and encourages peer reporting. Reporting of peer misconduct is already advocated and practiced by a number of means, including academic honor systems, corporate ethics hot lines, and professional association codes of conduct. However, the language people use to describe peer reporting is almost always negative. Words like "informer," "fink," "rat," "snitch," "stool pigeon," and "tattletale" all reflect the negative connotation society attaches to this behavior. Although it might seem helpful to have the benefit of extra eyes for management, the actual practice of peer reporting raises the specter of Big Brother. Formally appointed officials like supervisors and teachers are expected to observe and report misconduct. Peers are not. Obviously, peer reporting must be implemented with care. Individuals charged with misconduct must always receive the benefit of due process. With this caution in mind, we suggest that when misconduct is serious, peer reporting may be both a desirable and appropriate means of expanding the control function to manage unethical behavior in organizations.

Future research on peer reporting should expand the current findings and explore the potential influence of additional variables on peer reporting. For example, it might explore the impacts of positive and negative group consequences, the magnitude of group consequences, designs of codes of conduct, and different organizational contexts. Other variables that might influence the occurrence of and reaction to peer reporting might include group characteristics (Greenberger et al., 1987), the seriousness of the misconduct observed (Graham, 1986), the relationship between a violator and a potential peer reporter, protection for the peer reporter (U.S. Merit Systems Protection Board, 1981, 1984), organizational commitment, and individual

differences such as locus of control and cognitive moral development (Brabeck, 1984; Graham, 1986; Trevino & Youngblood, 1990).

Finally, this research did not address the possible deterrent effects of peer reporting on future misconduct. It is possible that structuring the interests of group members and role responsibilities in a way that makes peer reporting more likely may also affect the number of violations that occur (Hollinger & Clark, 1983). Tittle (1980) suggested that the most powerful deterrent to misconduct in organizational situations is the probability of suffering the imposing of sanctions by one's peers.

Implications for Management

This research supports the idea that, in the absence of social structures supporting peer reporting, work group members operate under severe pressures that prohibit that behavior. Peer reporters are negatively evaluated as "snitches" and "stool pigeons," and work group members have little inclination to report peers' misconduct. In fact, they may be more inclined to actively assist or protect a violator (Hollinger & Clark, 1983; Roethlisberger & Dixon, 1956) than to assist management through peer reporting.

However, the two social context conditions proposed and tested in the studies reported here, group sharing of the consequences of a violation and prescribed responsibility for the peer reporting role, can influence the acceptability of peer reporting and group members' inclination to engage in this behavior in organizations. Under these conditions, individuals are not only more likely than they would be otherwise to state that they are inclined to report a peer's misconduct to management, but the costs to them of filling this role may be reduced. When groups share the cost of a violation or adopt a code of conduct that mandates the reporting of violations to authorities, peer reporters are more likely to be positively evaluated by their peers. The reporting behavior is not considered to be particularly "ethical" because it is expected and/or in the interests of group members. In contrast, when the consequences of the violation are not shared or peer reporting is not defined as a responsibility of group members, they may consider a peer reporter highly ethical but reject the person.

The findings also suggest that codes of conduct can be used to influence the definition of role responsibility and people's inclination to report peers. Across the three studies, role responsibility, invoked via an established code of conduct, had the most powerful influence on the inclination to report. However, previous research on ethics codes has suggested that codes are ineffective (Cressey & Moore, 1983; Mathews, 1987). For a conduct code and peer-reporting responsibility to influence behavior, its acceptance by organization members may be essential. For example, the qualitative data in the academic cheating scenario study suggested that students had some resistance to accepting responsibility for peer reporting. They preferred to rely on faculty members to monitor cheating and catch violators. The implication is that managers who are interested in influencing peer reporting should focus

at least initially on gaining acceptance of a conduct code that incorporates individual responsibility for peer reporting.

Finally, this work on peer reporting may have practical implications for self-managing work teams (Manz & Sims, 1989). Research on such teams has not addressed the question of how management can structure a work group environment so that serious misconduct like unethical behavior will be brought to its attention without rejection of the peer reporter by other group members. This research suggests at least two ways that this goal can be accomplished—by structuring the reward system or by influencing perceptions of role responsibility.

REFERENCES

Alchian, A. A., & Demsetz, H. 1972. Production, information costs, and economic organization. *American Economic Review,* 62: 777–795.

Bales, R. F. 1958. Task roles and social roles in problem-solving groups. In E. E. Macoby, T. M. Newcomb, & E. L. Hartley (Eds.), *Readings in social psychology:* 437–447. New York: Holt, Rinehart, & Winston.

Brabeck, M. 1984. Ethical characteristics of whistleblowers. *Journal of Research in Personality,* 18: 41–53.

Cressey, D. R., & Moore, C. A. 1983. Managerial values and corporate codes of ethics. *California Management Review,* 25(4): 53–77.

Eisenhardt, K. 1989. Agency theory: An analysis and review. *Academy of Management Review,* 14: 57–74.

Feinstein, S. 1990. Worker theft imposes rising costs on retailers, customers. *Wall Street Journal,* 215(24): 1.

Feldman, D. C. 1984. The development and enforcement of group norms. *Academy Management Review,* 9: 47–53.

Fishbein, M., & Ajzen, I. 1975. *Belief, attitude, intention, and behavior: An introduction to theory and research.* Reading, MA: Addison-Wesley.

General Dynamics Corporation. 1988. *Ethics Program Update. General Dynamics.* St. Louis, MO: General Dynamics Corporation.

Graen, G. 1983. Role-making processes within complex organizations. In M. D. Dunnette (Ed.), *Handbook of industrial and organizational psychology:* 1201–1246. New York: Wiley.

Graham, J. W. 1986. Principled organizational dissent: A theoretical essay. In B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior,* vol. 8: 1–52. Greenwich, CT: JAI Press.

Greenberger, D. B., Miceli, M. P., & Cohen, D. J. 1987. Oppositionists and group norms: The reciprocal influence of whistle-blowers and co-workers. *Journal of Business Ethics,* 6: 527–542.

Hamilton, V. L., & Sanders, J. 1981. Effects of roles and deeds on responsibility judgments: The normative structure of wrongdoing. *Social Psychology Quarterly,* 44: 237–254.

Hart, H. L. A. 1968. *Punishment and responsibility.* New York: Oxford University Press.

Hollinger, R. C., & Clark, J. P. 1983. *Theft by employees.* Lexington, MA: Heath.

Katz, D., & Kahn, R. 1978. *The social psychology of organizations.* New York: Wiley.

Kelman, H. C., & Hamilton, V. L. 1989. *Crimes of obedience: Toward a social psychology of authority and responsibility.* New Haven, CT: Yale University Press.

Kohlberg, L. 1981. *Essays on moral development* (1st ed.). San Francisco: Harper & Row.

Locke, E. A., & Latham, G. P. 1990. *A theory of goal setting and task performance.* Englewood Cliffs, NJ: Prentice-Hall.

McCallum, D. M., Harrung, K., Gilmore, R., Diennan, S., Chase, J. P., Insko, C., & Thibaut, J. 1985. Competition and cooperation between groups and between individuals. *Journal of Experimental and Social Psychology,* 21: 301–320.

Maclagan, P. W. 1983. The concept of responsibility: Some implications for organizational behavior and development. *Journal of Management Studies,* 20: 411–423.

Manz, C., & Sims, H. 1989. *Leading others to lead themselves: Superleadership.* New York: Prentice-Hall.

Mathews, M. C. 1987. Codes of ethics: Organizational behavior and misbehavior. In W. C. Frederick (Ed.), *Research in corporate social performance and social policy,* vol. 9: 107–130. Greenwich, CT: JAI Press.

Miceli, M. P., & Near, J. P. 1984. The relationships among beliefs, organizational position, and whistle-blowing status: A discriminant analysis. *Academy of Management Journal,* 27: 687–705.

Miceli, M. P., Near, J. P., & Schwenk, C. R. 1989. *Individual and organizational predictors of whistle-blowing.* Working paper no. 89-4, College of Business, Ohio State University, Columbus.

Miles, M. B., & Huberman, A. M. 1984. *Qualitative data analysis.* Beverly Hills, CA: Sage.

Murphy, P. E. 1989. Creating ethical corporate structures. *Sloan Management Review,* 30(2): 81–87.

Near, J. P. 1989. Whistle blowing: Encourage it. *Business Horizons,* 32(1): 2–6.

Near, J. P., & Miceli, M. P. 1985. Organizational dissidence: The case of whistle-blowing. *Journal of Business Ethics,* 1: 1–16.

Near, J. P., & Miceli, M. P. 1986. Retaliation against whistle-blowers: Predictors and effects. *Journal of Applied Psychology,* 71: 137–145.

Ouchi, W. 1979. A conceptual framework for the design of organizational control mechanisms. *Management Science,* 25: 833–847.

Roethlisberger, F. J., & Dickson, W. J. 1956. *Management and the worker.* Cambridge, MA: Harvard University Press.

Rosenbaum, M. E., Moore, D. L., Cotton, J., Cook, M. S., Hieser, R. A., Shovar, M. N., & Gray, M. 1980. Group productivity and process: Pure and mixed reward structures and task interdependence. *Journal of Personality and Social Psychology,* 39: 626–642.

Salancik, G., & Pfeffer, J. 1978. A social information-processing approach to job attitudes and task design. *Administrative Science Quarterly,* 23: 224–253.

Schwartz, S. 1968. Words, deeds, and the perception of consequences and responsibility in action situations. *Journal of Personality and Social Psychology,* 10: 232–242.

Shaw, M. E. 1971. *Group dynamics.* New York: McGraw-Hill.

Steel, R. P., & Ovalle, N. K., 2d. 1984. A review and meta-analysis of research on the relationship between behavioral intentions and employee turnover. *Journal of Applied Psychology,* 69: 673–686.

Tannenbaum, A. 1968. *Control in organizations.* New York: McGraw-Hill.

Tittle, C. R. 1980. *Sanctions and social deviance: The question of deterrence.* New York: Praeger.

Trevino, L. K., & Youngblood, S. A. 1990. Bad apples in bad barrels: A causal analysis of ethical decision-making behavior. *Journal of Applied Psychology,* 75: 378–385.

Tubbs, M. E., & Ekeberg, S. E. 1991. The role of intentions in work motivation: Implications for goal-setting theory and research. *Academy of Management Review,* 18: 180–199.

U.S. Merit Systems Protection Board. 1981. *Whistleblowing and the federal employee.* Washington, DC: U.S. Government Printing Office.

U.S. Merit Systems Protection Board. 1984. *Blowing the whistle in the federal government: A comparative analysis of 1980 and 1983 survey findings.* Washington, DC: U.S. Government Printing Office.

Zemke, R. 1986. Employee theft: How to cut your losses. *Training,* 23(5): 74–78.

APPENDIX A

Academic Cheating Scenario

Pat is a junior at Eastern State University, a state-supported university on the east coast. Today, Pat is taking the final exam in a course in the major. There are about 35 students in the course and they have gotten to know each other quite well through many group exercises and discussions.

Interests of Group Members

In this class, letter grades on the exam are figured on a curve. So, one student's performance on the exam will influence the grades of all other students in the class.

<p align="center">or</p>

In this class, letter grades on the exam are figured based upon standard criteria: 90–100 is an A, 80–90 is a B, etc. So, one student's performance on this exam will not influence the grades of any other students in the class.

Role Responsibility

Because of the established honor code at Eastern, the professor is not proctoring this exam. Students are "on their honor" not to cheat and they are responsible for reporting any cheating they observe.

<p align="center">or</p>

As usual, the professor is proctoring this exam for any cheating.

Pat looks up for a moment to ponder a question and sees a student copying answers from another student's exam. After giving it some thought, Pat tells the professor about the cheating as soon as the exam is over.

Fast-Food Theft Scenario

Pat is a junior at Eastern University and works for Pepe's Pasta and Pizza, a fast food franchise with restaurants all over the east coast. Pepe's employs about 35 students from the nearby university. The students have gotten to know each other quite well and enjoy working together. The company has rules about not taking food or eating food while working.

Interests of Group Members

All workers have their pay docked to cover food losses that are documented monthly by the company's sophisticated inventory control system.

<p align="center">or</p>

Although the company's sophisticated inventory control system documents food losses monthly, the company doesn't dock all workers' pay for losses due to theft that are found during inventory like some companies do.

Role Responsibility

As part of the company's established ethics code, employees are "on their honor" not to take food or eat food while they are working. The student workers have all agreed to take responsibility for reporting any violations they observe. Because of the ethics code, supervisors feel comfortable leaving the workers on their own for a while at times.

or

It is the supervisors' responsibility to keep an eye out for violators.

Pat happens to see a coworker stuffing frozen pizzas into a knapsack before signing out and leaving for the day. After giving it some thought, Pat tells the supervisor about the stealing as soon as he returns.

APPENDIX B

Manipulation Check Results

Academic Cheating Scenario

Scenarios invoking role responsibility significantly influenced subjects' responses to the item "Students were responsible for proctoring the exam ($F_{1,437} = 335.538$, $p < .0001$) and to "Faculty were responsible for proctoring the exam" ($F_{1,437} = 562.844$, $p < .0001$). Scenarios invoking the interests of group members significantly influenced responses to "Letter grades in the course were based on a curve" ($F_{1,437} = 840.071$, $p < .0001$) and to "Letter grades in the course were based upon standard criteria" ($F_{1,437} = 583.183$, $p < .0001$).

Fast-Food Theft Scenario

Analysis of variance tests for the influence of the role responsibility factor on the manipulation check questions showed that the manipulation significantly influenced responses to "Coworkers were responsible for monitoring food theft" ($F_{1,106} = 38.56$, $p < .0001$) and to "Supervisors were responsible for monitoring food theft" ($F_{1,106} = 11.091$, $p < .001$). The pay-docking manipulation significantly influenced responses to "At Pepe's, every worker's pay was affected by losses found during inventory" ($F_{1,106} = 140.228$, $p < .0001$) and to "At Pepe's, every worker's pay was NOT affected by losses found during inventory" ($F_{1,106} = 150.913$, $p < .0001$).

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ANTECEDENTS TO COMMITMENT TO A PARENT COMPANY AND A FOREIGN OPERATION

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This study of 321 American managers on international assignment in Pacific Rim or European countries assessed theoretically and empirically the extent to which various personal, job, organizational, and nonjob factors accounted for commitment to their parent companies and foreign operations. Regression analyses found both common and unique antecedent variables related to each target of organizational commitment; furthermore, discriminant analysis revealed patterns of dual and unilateral commitments based on specific job, organizational, and nonjob factors. The results reinforce the importance of nonjob factors to organizational commitment in international settings. Implications for research on commitment and human resource management are discussed.

The increasing globalization of business has been paralleled by an increase in the number of international strategic alliances, foreign subsidiaries, overseas representative offices, and so on (Adler, 1986; Hall, 1986; Kindleberger & Audretsch, 1983; Kobrin, 1987). As the international activities of firms increase, they send many employees overseas temporarily. During these international assignments, employees are affiliated not only with the parent organization from which they came and to which they will typically return, but may also become members of a local operation, or organization, which is distinguishable from the parent firm (Scott, 1981). In a foreign country, an operation is embedded in a set of social, cultural, political, and often managerial environments that significantly differ from its parent's environments and collectively contribute to its distinctness from the parent company. Such novel environments can create an organizational distinctiveness even if the foreign operation is a fully owned subsidiary of a parent firm. As a consequence, overseas assignments present the possibility that employees will develop dual organizational commitments. Although the development of dual commitment has potential relevance to all international employees, it may hold even more importance for those in certain overseas positions. For example, it seems essential to the overall success of executives and managers during their international assignments since they

are often responsible for balancing the interests of their parent firms with the unique aspects of their local operations.

Although internationally assigned employees can potentially develop commitments to both their parent companies and local operations, researchers have cited common parent company concerns that such employees will either "go native" and fail to incorporate their parent companies' perspectives into their decisions or "leave their hearts at home" with the parent companies and fail to identify with the local operations' interests (Adler, 1986; Brislin, 1981; Torbiorn, 1982; Tung, 1982). Given the practical importance of creating commitment to a foreign operation while sustaining commitment to a parent company, it seems critical for researchers to understand the nature of dual organizational commitment for managers on international assignment.

Although previous studies have examined the general phenomenon of organizational commitment (e.g., Glisson & Durrick, 1988; Mowday, Porter, & Steers, 1982), the importance of dual commitment during international assignments deserves specific examination for several reasons. Researchers have found that organizational commitment seems to be inversely related to intentions to leave an organization and to actual turnover as well (Lee & Mowday, 1987; Mowday et al., 1982; Price, 1977). In the context of international assignments, sustaining commitment to a parent company may be very important because approximately 25 percent of all those sent on overseas assignments leave their parent companies within a year of returning (Black, 1988; Gregersen & Black, 1990). Inaccurate expectations, lack of repatriation training or orientation, and insufficient career planning on the part of firms are thought to contribute to this high rate of leaving (Adler, 1986). The average annual cost of maintaining a U.S. employee abroad is about $300,000 a year (Lublin, 1989), and the average overseas assignment lasts about four years (Black, 1988), so companies invest about $1.2 million for each overseas assignment. Given the high rate of leaving, the average U.S. multinational corporation has about a one in four chance of gaining essentially no long-term return on this substantial investment.

Creating commitment to local operations may also be important for intrafirm turnover reduction. Recent studies of U.S. employees on international assignment (Black, 1988; Copeland & Griggs, 1985; Gregersen & Black, 1990; Tung, 1982) have found that about one in five return prematurely, usually at their own request, with each premature return costing approximately $250,000. Copeland and Griggs (1985) estimated that multinationals lose over $2 billion per year in direct costs associated with this turnover. Narrow selection criteria, lack of predeparture cross-cultural training, and inadequate support mechanisms seem to influence these premature returns (see Black, Mendenhall, and Oddou [1991] for a review). The apparent difficulty of retaining employees both during and after international assignments reinforces the importance of researching and understanding the dynamics of dual organizational commitment. For international human resource managers, the bottom-line question is, "How can we get our people to

be committed to the local operation they are assigned to and yet still identify with the parent company?"

The organizational commitment literature provides some theoretical and empirical insights into this question, in general pointing to the roles of personal, job, organizational (Glisson & Durrick, 1988; Steers, 1977), and— to a lesser extent—nonjob predictors of commitment to a single organization (Mowday et al., 1982). However, relatively little research has compared the antecedents of different forms of commitment, and most of that research has focused on the relationship of certain categories of antecedents to dual commitment to a union and a firm (Angle & Perry, 1986; Fukami & Larson, 1984; Gordon, Philpot, Burt, Thompson, & Spiller, 1980; Magenau, Martin, & Peterson, 1988; Martin & Peterson, 1987) or to a profession and a firm (Aranya, Kushner, & Valency, 1986; Bartol, 1979; Hrebriniak & Alutto, 1972; Lachman & Aranya, 1986; Ritzer & Trice, 1969; Sheldon, 1971; Stevens, Beyer, & Trice, 1978; Tuma & Grimes, 1981). No study to date has examined all four categories of antecedents and their relationships with dual commitment. Furthermore, much of this research has suggested that although some variables are predictors for two targets of commitment, many general predictors of commitment to a firm cannot be extrapolated to other targets of commitment, such as a union (Gordon et al., 1980; Magenau et al., 1988). Thus, findings of research on commitment in general provide significant guidance for research on dual commitment, but cannot be applied directly to the international context without significant modifications. Furthermore, differences between traditional domestic contexts of commitment and international contexts reduce the probability that past findings in the general organizational commitment literature can be directly extrapolated to international assignments and the related dual commitment to a parent company and a foreign operation.

Several additional shortcomings of extant organizational commitment research for investigating international assignments and dual commitment can be identified. First, researchers have either assumed the presence of a relatively stable domestic job environment or have conducted research in such an environment. In contrast, overseas assignments are nearly always temporary and usually involve significant changes in responsibilities as well as in the organizational contexts in which a job is performed (Adler, 1986; Black, 1988; Tung, 1981).

Second, researchers have generally ignored nonjob variables as predictors of commitment, though some scholars have argued for their importance (Mowday et al., 1982). International assignments usually place individuals in new and unfamiliar managerial, organizational, industrial, and societal contexts. Thus, it would seem that nonjob factors would be especially relevant to organizational commitment during international assignments.

Thus, the research goals and potential contributions of this study can be summarized as follows. First, we planned to simultaneously examine the influence of variables from all four established categories on dual commitment in an international context. Second, we sought to offer a theoretical

contribution by examining the extent to which job assignments in international contexts increase or decrease the relevance of antecedents of organizational commitment. Third, we hoped to provide theoretical insights by differentiating common predictors of commitment to both a parent company and a foreign operation from unique predictors of unilateral commitment. Finally, as mentioned earlier, we sought to add to international human resource executives' understanding of dual and unilateral commitment.

CONCEPTUAL FOUNDATIONS

Much empirical research concerns organizational commitment; Mowday and colleagues (1982) provide an extensive review. Many authors have discussed the etiology of commitment (e.g., Etzioni, 1961; Kanter, 1968; Mowday et al., 1982; O'Reilly & Chatman, 1983; Porter & Smith, 1970; Salancik, 1977; Weiner, 1982). We followed Reichers's (1985) suggestion that researchers build on the attitudinal school of thought when investigating multiple commitments (e.g., Gregersen, 1992; Reichers, 1986). Focusing on the extent to which individuals identify simultaneously with both a parent company and a foreign operation, we defined commitment as a psychological construct based on identification with a particular target (Bowlby, 1982; O'Reilly & Chatman, 1983; Sanford, 1955; Sheldon, 1971; Stoke, 1950; Tolman, 1943). This focus stemmed from our underlying interest in the factors that create a strong commitment to or identification with a local operation and at the same time sustain a strong commitment to or identification with a parent company during an international assignment.

Recent work has grouped the antecedents of organizational commitment into three general categories: personal, job, and organizational (Glisson & Durrick, 1988). Since Glisson and Durrick conducted their research in a domestic context, and commitment research in domestic contexts has often ignored nonjob variables (Mowday et al., 1982), it is not surprising that those authors failed to incorporate nonjob variables into their analysis. However, in the assessment of organizational commitment in an international context, it seems essential to include nonjob variables as an additional fourth category of antecedents.

Antecedents of Dual Commitment During International Assignments

Personal characteristics. A wide range of personal characteristics have been associated with organizational commitment (Glisson & Durrick, 1988; Mowday et al., 1982). One theoretical framework that seems to explain the relationships between many of these personal characteristics and the development of organizational commitment can be derived from Becker's (1960) analysis. Becker and others (e.g., Hrebriniak & Alutto, 1972; Ritzer & Trice, 1969; Stevens et al., 1978) have theorized that individuals make personal investments, like years spent in a firm and money put into pension funds, that constrain their behavior and create commitment to the firm. Becker (1960) specifically suggested that these "side bets," or investments, are prior

actions that affect an individual's degree of involvement in a present situation. If investments produce commitment, several personal characteristics are potentially important predictors of dual commitment during international assignments.

Organizational tenure has been a consistent predictor of organizational commitment (Angle & Perry, 1983; Luthans, McCaul, & Dodd, 1985; Mowday et al., 1982; Stevens et al., 1978). In general, the explanation for this relationship has been that the longer people have been with a firm, the greater are their investments in it. To capitalize on these investments, they exhibit commitment (Becker, 1960; Hrebriniak & Alutto, 1972). In the context of international assignments, there are two types of tenure to consider: tenure in the parent company and in the foreign operation. We expected that the longer people have been with a parent company, the greater will be their commitment to it. However, tenure in the parent company might also be positively related to commitment to the foreign operation. Because that operation is in one sense an extension of the parent company, the same explanation of the positive relationship between tenure and commitment would seem to apply, though perhaps less strongly. By the same logic, tenure in a foreign operation is also likely to be positively associated with commitment to both the parent and foreign organization because the longer people have been with the latter, the greater their investment in it, and indirectly, in the parent company.

Another potentially important personal characteristic relevant to dual organizational commitment during international assignments is previous overseas experience (Black, 1988). The more such experience people have had, the greater is the likelihood of their holding accurate expectations concerning current international assignments (Louis, 1980). Past research has found a consistent, positive relationship between the development of accurate expectations and organizational commitment (Buchanan, 1974; Feldman, 1976; Steers, 1977; Stumpf & Hartman, 1984). However, since previous international experience is more likely to help individuals form accurate expectations about foreign operations than about parent companies, we expected such experience to relate primarily to commitment to foreign operations.

> *Hypothesis 1a: Tenure in a parent company and tenure in a foreign operation will be positively associated with commitment to a parent company.*

> *Hypothesis 1b: Tenure in a parent company, tenure in a foreign operation, and previous international experience will be positively associated with commitment to a foreign operation.*

Job characteristics. Several job characteristics should be important correlates of organizational commitment (Mowday et al., 1982; Near, 1989). Salancik (1977) argued that one theoretical rationale for the relationship between many job characteristics and organizational commitment is the de-

gree to which they create a sense of "felt responsibility" in job incumbents, a state that empowers individuals to act. The stronger the sense of felt responsibility, the stronger the commitment to the organization in which that responsibility has been developed.

Role discretion is likely to increase felt responsibility and therefore to be positively related to organizational commitment (Angle & Perry, 1983; Marsh & Mannari, 1977; Near, 1989; Stumpf & Hartman, 1984). The greater an individuals' discretion as to what work gets done, how it gets done, and by whom (Stewart, 1982), the greater the empowering sense of responsibility the individual would feel for those decisions. Role discretion may be particularly relevant to internationally assigned employees since they often experience high autonomy when they are far from parent companies' headquarters (Adler, 1986; Black, 1988).

In contrast, role ambiguity and role conflict may reduce felt responsibility and thus, commitment to an organization (Morris & Koch, 1979; Morris & Sherman, 1981; Podaskoff & Williams, 1986). The more ambiguous role responsibilities are, the less likely individuals are to feel an empowering sense of responsibility. Some people may still feel quite responsible for performing role-related tasks when uncertainty exists about what to do, but their sense of responsibility is essentially inert because they cannot act on it. Consequently, we expected that the higher the role ambiguity, the lower the organizational commitment, especially commitment to the local organization within which responsibilities are being carried out. Yet because parent companies are likely to be seen as responsible for giving assignments to overseas positions, role ambiguity is also likely to relate to commitment to the parent companies. By this logic, role conflict, a situation in which two or more entities have conflicting expectations of an individual, would make it more difficult for the individual to have a sense of empowering felt responsibility and therefore, a sense of commitment to both organizations.

Expectancy theory provides additional theoretical support for these posited relationships. In their review of work on relationships between role ambiguity and role conflict and commitment, Jackson and Schuler (1985) cited several studies (e.g., Beehr, Walsh, & Taber, 1976; Lee & Schuler, 1982) offering some support for the argument that role ambiguity and role conflict decrease the probability that employees' efforts will result in appropriate performance (Porter & Lawler, 1968). That diminishment in turn decreases the instrumentality of their performance for procuring valued outcomes, and over time that failure reduces commitment.

> *Hypothesis 2a: Role discretion will be positively associated with commitment to both a parent company and a foreign operation.*

> *Hypothesis 2b: Role ambiguity and role conflict will be negatively associated with commitment to both a parent company and a foreign operation.*

Organizational characteristics. Several organizational variables seem important potential explanations of dual organizational commitment during international assignments. Past research (Angle & Perry, 1983; Buchanan, 1974; Steers, 1977) suggests that to the extent they see an organization as dependable and supportive, people exhibit commitment to the organization. Given the dramatic changes that most employees and their families experience during international assignments (Adler, 1986; Black, 1988; Black & Stephens, 1989; Copeland & Griggs, 1985; Tung, 1988), policies and practices concerning preparation before an assignment, support during it, and preparation for the employee's return would seem to be important areas in which a firm might be seen as more or less dependable and supportive. Since overseas assignments are temporary, parent companies are generally responsible for human resource policy and practices affecting internationally assigned employees. Consequently, we expected those issues to have a significant relationship primarily with commitment to parent companies.

One indicator of a parent company's support for employees embarking on international assignments is provision of predeparture training. Past research has shown significant interfirm differences on providing such training. Given its relevance to successful international assignments (Black, 1988; Black & Mendenhall, 1990; Tung, 1982), we expected that the more predeparture training a parent company provided for employees, the greater would be their commitment to the company since they would see it as supportive and dependable (Angle & Perry, 1983; Steers, 1977). It is also possible that such training could enhance employees' commitment to the local operation to which they are assigned. Like previous international experience, such training could help people understand host countries' cultures and consequently help develop accurate and realistic expectations (Black & Mendenhall, 1990). We expected accurate expectations about host environments to relate positively to commitment to local operations embedded in those environments.

A second aspect of parent companies' support for employees on international assignment concerns information about career advancement, structural changes, corporate politics, and the like (Adler, 1986; Copeland & Griggs, 1985; Tung, 1981). The "out-of-sight, out-of-mind" approach taken by many parent companies often results in significant career and job-related problems when employees return from international assignments (Adler, 1980, 1981; Harvey, 1989). To reduce these potential problems, some firms formally designate "sponsors" in the home country to provide current information to employees during their international assignments. Employees are likely to view organizations that provide such sponsors as more supportive and dependable than other companies and to exhibit greater commitment to them.

Third, the temporary nature of international transfers raises concerns for many employees about their repatriation (Adler, 1981; Clague & Krupp, 1978; Harvey, 1989; Kendall, 1981). If a parent company makes its repatriation practices clear to employees, it demonstrates its supportiveness and

dependability. Of course, we would not expect an international employee to
see a parent firm as supportive and dependable if it clarifies the repatriation
process and by so doing, shows how poorly the process will be handled. But
we would also not expect firms to attempt to clarify the repatriation process
if it is handled poorly; doing so simply would not be in the firm's self-
interest.

Indeed, previous research indicates that firms that do clarify the repa-
triation process do so because they tend to manage it better than other organ-
izations. For example, Gomez-Meija and Balkin (1987) found that clarity of
the repatriation process was significantly and positively related to the ade-
quacy of return assistance provided to employees, their understanding of
their return assignments, and perhaps most important, their overall satisfac-
tion with the repatriation process. Accordingly, we expected that employees
would see such firms as more supportive and dependable than others and,
accordingly, would exhibit strong commitment to their parent companies,
but not necessarily to their local operations, which are generally less in-
volved with the repatriation process.

> *Hypothesis 3a: Predeparture training for employees as-*
> *signed abroad, formal organizational sponsors, and clar-*
> *ity of repatriation practices will be positively associated*
> *with commitment to a parent company.*

> *Hypothesis 3b: Predeparture training for employees as-*
> *signed abroad will be positively associated with their*
> *commitment to a foreign operation.*

Nonjob characteristics. Mowday and colleagues (1982) argued theoret-
ically that nonjob variables are an important category of predictors of organ-
izational commitment, but empirical evidence has suggested that some non-
job variables are not consistently related to commitment in a domestic con-
text (Angle & Perry, 1983; Parasuraman, Greenhaus, Rabinowitz, Bedeian, &
Mossholder, 1989). However, given the major nonjob transitions (Black,
1988; Black & Stephens, 1989) that occur during international assignments,
we expected that nonjob variables would play an important role in the de-
velopment of dual commitment.

Just as investments made in organizations can strengthen commitment
(Becker, 1960; Salancik, 1977), investments individuals make to adjust and
integrate into a nonjob environment should spill over (Crouter, 1984) to
strengthen work-related commitment. Personal investments like learning the
language, history, cultural norms, and rituals of a country could result in a
greater commitment to and identification with the local organization em-
bedded in the novel nonjob environment (Luthans et al., 1985). Although
personal investments made to master a nonjob environment may have some
marginal relationship with commitment to a parent company, we did not
expect this connection to be significant because parent companies are gen-
erally far away from people on international assignment, and investments
made to function effectively in a local culture are not likely to have much

instrumental value back in the home country. Theoretical support for this differentiation comes from Porter, Lawler, and Hackman (1975), who argued that ceterus paribus, proximal factors exert a more significant impact on organizational commitment than distal factors.

People must usually invest much time and energy to adjust to such aspects of a novel cultural setting as transportation systems, housing arrangements, health care providers, and food types and preparation. Thus, we expected that the stronger an individual's sense of adjustment to the general environment of a host country, the more investments the individual has made, and the stronger will be the commitment to the local operation, but not necessarily to the parent company.

In domestic research settings, social integration has been found to relate positively to organizational commitment (Buchanan, 1974; Near, 1989; Rotundi, 1975; Sheldon, 1971), suggesting that the more integrated people become into a social context, the more they become committed to their organizations. Extending these domestic findings to international assignments, we suggest that the more social interaction international employees have after work with host country nationals—whether fellow employees or not—the greater their integration into the local culture (Black, 1988) and thus their commitment to the local operation embedded in that culture.

> Hypothesis 4: Adjustment to the general environment of a country of assignment and interaction with host nationals will be positively associated with commitment to a foreign operation.

METHODS

Sample

The sample for this study was drawn from the American Chambers of Commerce directories of U.S. nationals working as managers for operations with ties to U.S. firms in four Pacific Rim countries—Japan, Korea, Taiwan, and Hong Kong—and four Western European countries: Belgium, England, the Netherlands, and West Germany. Although the directories used do not list all Americans working in these countries, they are the most comprehensive lists available; other directories are usually restricted to particular business or industry groups, and the only complete lists of Americans working in these foreign countries are held by the countries' immigration offices, which will not release their lists. We chose the Pacific Rim and Western Europe because they are areas of important international business activity for U.S. firms, heightening the likelihood that American managers will be transferred to one of these areas and will need to adjust to living and working there.

Only individuals working for operations with clear ties to U.S. parent firms were selected. The Chamber of Commerce directories indicate when operations have some degree of U.S. ownership but do not give the exact

amount of ownership. We mailed questionnaires to 250 randomly selected managers in each Pacific Rim country but to 125 in each Western European country because fewer Americans were listed in the European directories. The exact reasons for this difference is uncertain. It may be that because European cultures are more similar than Asian cultures to American culture (Hofstede, 1980), parent firms employ more host country nationals as managers in Western Europe than in Asia.

Of the total 1,000 questionnaires sent to the Pacific Rim countries, 220 were returned, a response rate of 22 percent. Of the total 500 questionnaires sent to the European countries, 101 were returned, a response rate of 20 percent. The overall response rate for the entire sample was 21.4 percent, a rate as high or higher than that of most other international survey studies (Dawson & Dickinson, 1988; Dillman, 1978; Jobber & Sounders, 1988; Tung, 1981).

Respondents were upper- and middle-level executives who had been with their parent firms for an average of 13.9 years. Their average age was 44.5 years, and their spouses' average age was 42.7 years. Nearly all were men (95%), and 86 percent were married. A direct comparison of respondents' and nonrespondents' demographic characteristics was not feasible, but the average age, tenure, gender, and marital status reported closely paralleled general characteristics of Americans working abroad reported in related empirical research (e.g., Black, 1988; Gomez-Meija & Balkin, 1987; Hawes & Kealey, 1981).

To test for potential differences in demographic variables attributable to respondents' countries of assignment, we performed one way analyses of variance (ANOVAs) on each demographic variable with country as the independent variable. No significant differences in means emerged for age, gender, and marital status. Differences among means for tenure in a parent company did emerge but did not follow a regional pattern (Hofstede, 1980). The mean for at least one European country was lower than the mean for at least one Pacific Rim country. Consequently, we did not consider these differences problematic.

As a final assessment of potential country effects, we conducted one-way ANOVAs on the dependent variables of interest, commitment to a parent company and to a foreign operation. For both variables, no significant mean differences were found based on respondents' countries of assignment. In sum, the ANOVA analyses collectively suggested that the data had no systematic bias across countries and thus could be analyzed together.

Measures

In an effort to reduce common method variance, we took several steps. First, we measured 6 of the 11 independent variables by asking the managers objective rather than attitudinal questions. Objective variables included tenure in their parent firms, tenure in their local operations, previous international experience, hours of predeparture training, existence of an organizational sponsor, and frequency of social interaction with host country nation-

als. Second, throughout the questionnaire we interspersed attitudinal variables, such as role ambiguity, conflict, and discretion, the perceived clarity of repatriation policies, and perceived adjustment to the nonjob environment, with more objective items to try to reduce potential response set bias.

Organizational commitments. We adopted five-point Likert scales of four items each from Mowday and colleagues' (1982) and O'Reilly and Chatman's (1983) research to assess commitments to the parent company and the local operation. A principal components analysis with a varimax rotation was performed on all organizational commitment items to determine if two separate targets of commitment empirically existed. Table 1 presents the results. As expected, the analysis produced two distinct factors with eigenvalues greater than 1. Collectively, these factors accounted for 62 percent of the variance.

The first factor (α = .84) was composed of four items focusing on commitment to a parent company. The second factor, also of four items, reflected commitment to a foreign operation (α = .72).

Independent variables. Tenure in both the parent company and foreign operation were self-report measures assessing the total number of months an individual had worked in the organization.

Previous international work experience was measured by asking respondents to indicate the total number of years they had worked with any firm or formal organization in a foreign country prior to their current international assignment.

TABLE 1
Factor Analysis of Commitment Measures[a]

Items	Factor 1	Factor 2
"The reason I prefer this parent company to others is because of its values, of what it stands for."	**.85**	.19
"I really care about the fate of this parent company."	**.83**	.16
"I talk up this parent company to my friends as a great place to work."	**.78**	.12
"What this parent company stands for is important to me."	**.73**	.35
"What my local firm stands for is important to me."	.14	**.78**
"I really care about the fate of my local firm."	.11	**.71**
"I talk up my local firm to my friends as a great group to work with."	.27	**.70**
"The reason I prefer this local company to others is because of its values, of what it stands for."	.18	**.70**
Eigenvalues	3.66	1.32
Percentage of variance explained	45.7	16.6

[a] Factor loadings greater than .40 are shown boldface.

Eight items on a five-point scale (1 = strongly disagree, 5 = strongly agree) were developed, based on work by Stewart (1982), to measure *work role discretion*. These items were: (1) "I have discretion as to what work gets done," (2) "I have discretion as to how work gets done," (3) "I have authority to decide what tasks to delegate," (4) "I have freedom to choose what to become an expert in," (5) "I have discretion as to what tasks subordinates do," (6) "I have authority to decide what work gets shared," (7) "I have freedom to decide how much of a generalist or expert to become," and (8) "I have discretion as to what I am responsible for." The coefficient alpha for this measure was .86.

Five items on a five-point scale were adopted from Rizzo, House, and Lirtzman (1970) to measure *role ambiguity* (α = .83).

Role conflict was measured on a five-point scale, with four items adopted from Rizzo and colleagues (α = .79).

Respondents were asked how many hours of *predeparture culture-related training* their firm provided.

Respondents indicated whether or not they had a domestic *organizational sponsor* who was responsible for keeping in touch with them for the duration of their international assignment (1 = no, 2 = yes).

Respondents indicated on a five-point Likert scale the extent to which they agreed with the statement, "My parent company has a *clear repatriation process*."

To measure *general adjustment* to a foreign nonjob environment, we used items from Black's (1988) study of expatriate general adjustment (α = .90).

A single item on a six-point Likert scale was adopted from Black (1990) to assess the frequency of respondents' *interaction outside of work with host country nationals*.

RESULTS

Table 2 provides descriptive statistics and zero-order correlations for all variables.

It indicates a positive relationship between the commitment of managers assigned abroad to their parent companies and local operations. It is important to note, however, that previous factor analysis results provided some empirical support for the conceptualization of commitment to a parent company and commitment to a foreign operation as two separate variables. Second, we see from Table 2 that the means for commitment to a parent company and commitment to a local operation are almost identical. Since most managers had been with their parent companies longer than they had been with the foreign operations, commitment to the latter might be expected to be somewhat lower than commitment to the parent companies; however, the findings suggest that managers can develop a significant level of commitment to their local operations even though they are on temporary assignment.

TABLE 2
Descriptive Statistics

Variables	Means	s.d.	1	2	3	4	5	6	7	8	9	10	11	12
1. Tenure in parent company	165.64	103.48												
2. Tenure in foreign operation	50.83	57.14	.21***											
3. International experience	5.91	6.78	.00	-.05										
4. Role discretion	3.96	0.57	.00	.09	.01									
5. Role ambiguity	2.84	0.92	-.05	-.07	-.14**	-.12*								
6. Role conflict	2.87	0.94	.01	-.09	-.06	-.23***	.51***							
7. Predeparture training	7.66	31.02	.21**	-.08	-.09	-.06	-.02	.14						
8. Organizational sponsor	1.38	0.49	.12*	.06	-.06	.13*	.01	.09	.09					
9. Clear repatriation practices	2.04	1.03	.08	-.09	-.08	.04	-.30***	-.15**	.11	.17***				
10. General adjustment to host country	5.42	0.94	.00	.26***	.03	.12*	-.16**	-.20***	-.16**	.02	.01			
11. Interaction with host nationals	4.25	1.17	.02	.08	.16**	.05	-.03	.03	.00	.02	-.10*	.14**		
12. Commitment to parent company	4.08	0.68	.21***	.00	.05	.25***	-.24***	-.23***	.24***	.18**	.23***	.01	.11*	
13. Commitment to foreign operation	4.09	0.58	.10*	.04	.14**	.38***	-.20***	-.15***	.05	.11*	.14**	.19***	.17**	.47***

* $p < .05$
** $p < .01$
*** $p < .001$

Results of Multiple Regression Analyses

Separate regression equations were computed for commitment to a parent company and commitment to a foreign operation in which we entered all independent variables simultaneously to assess their individual and collective relationships with each dependent variable while controlling for the shared variance with the other commitment variable. Table 3 reports these results.

Table 3 indicates that several independent variables were positively associated with commitment to both a parent company and a foreign operation, even with the shared variance controlled. For commitment to a parent company, one variable from each category—personal, job, organizational, and nonjob—was significant in the regression equation. For commitment to a foreign operation, one job and one nonjob variable were significant correlates.

Personal variables. Tenure in a parent company was positively associated with commitment to it, a finding providing partial support for Hypoth-

TABLE 3
Results of Multiple Regression Analyses

Independent Variables	Commitment to Parent Company		Commitment to Foreign Operation	
	β	t	β	t
Control				
Commitment to parent company			.39	6.61***
Commitment to foreign operation	.38	6.60***		
Personal				
Tenure in parent company	.12	2.19*	.02	0.36
Tenure in foreign operation	−.03	−0.51	−.02	−0.45
International experience	.00	0.00	.10	1.92†
Job				
Role discretion	.06	1.02	.28	5.06***
Role ambiguity	−.04	−0.66	−.06	−0.95
Role conflict	−.18	−2.88*	.07	1.12
Organizational				
Predeparture training	.19	3.14**	−.01	−0.11
Organizational sponsor	.10	1.84†	−.01	−0.12
Clear repatriation practices	.10	1.82†	.03	0.63
Nonjob				
General adjustment to host country	−.12	−2.12*	.16	2.96**
Interaction with host nationals	.08	1.45	.07	1.23
R^2	.37		.36	
F	11.87***		11.44***	
Adjusted R^2	.34		.33	

† $p < .10$
* $p < .05$
** $p < .01$
*** $p < .001$

esis 1a, which predicts that tenure in a parent firm and tenure in a local operation will be positively associated with commitment to a parent firm. In addition, Hypothesis 1b predicts that tenure in a parent company, tenure in a foreign operation, and previous international experience will be positively related to commitment to the foreign operation. Regression results did not support this hypothesis, although there was a trend relationship between previous international experience and commitment to a foreign operation ($p < .10$).

Job variables. Hypothesis 2a predicts that role discretion will be positively associated with commitment to both a parent company and a foreign operation. The results shown in Table 3 indicate partial support for this hypothesis. Role discretion was a significant correlate of commitment to a foreign operation, but it was not related to commitment to a parent. Hypothesis 2b predicts that role ambiguity and role conflict will be negatively associated with both commitments. Regression analysis found that only role conflict was related to commitment to a parent firm, and neither variable was related to commitment to a foreign operation.

Organizational variables. Hypothesis 3a predicts that predeparture training, organizational sponsorship, and clear repatriation policies will positively relate to commitment to a parent firm. The regression results provide some support for this hypothesis. Providing predeparture culture-related training was clearly a significant correlate of commitment to a parent company. Also, it is useful to note that the trend relationships of organizational sponsorship and repatriation practices were almost significant ($p < .10$) and in the posited direction. Finally, Hypothesis 3b, predicting that predeparture training would positively relate to commitment to a foreign operation, was not supported.

Nonjob variables. Hypothesis 4 predicts that adjustment to the general environment of a country of assignment and interaction with host nationals will positively relate to commitment to a foreign operation. Again, results provided partial support for this hypothesis in that general adjustment was a significant, positive correlate of commitment to a foreign operation but interaction with host nationals was not. Interestingly, general adjustment was also related to commitment to a parent company in the regression analysis; however, this was a significant, *negative* relationship.

Summary

The combined results of the regression analyses indicate that different personal, job, organizational, and nonjob factors are significant predictors of commitment to each type of organization studied here. Specifically, high tenure in a parent firm, low role conflict, much predeparture training, and low general adjustment to a country of assignment were associated with high commitment to parent firms. In contrast, high role discretion and high general adjustment were associated with high commitment to foreign operations. Collectively, these findings provide partial support for our hypotheses.

Regression analysis was an appropriate analytic tool for testing the degree to which certain hypothesized factors explained managers' commitments but was not appropriate for examining the patterns of commitment that may exist during international assignments. Previous theoretical and empirical research in domestic contexts has suggested that the very existence of multiple commitments implies that they are congruent, in conflict, or unrelated (Gordon & Ladd, 1990; Magenau et al., 1988; Reichers, 1985). More important to this study, numerous international management scholars (Bartlett & Ghoshal, 1987; Kobrin, 1987; Phatak, 1974; Prahalad & Doz, 1987) have outlined potentially conflictual relationships between parent firms' headquarters and foreign operations. Policy and procedural differences between the two types of organization could result in managers' developing unilateral commitments to either parent firms or foreign operations. In contrast, the synergistic combination of these differences (Adler, 1986) could result in high dual commitment, or commitment to both organizations. To examine these potential patterns, we undertook an exploratory discriminant analysis.

Discriminant Analysis Results

Since discriminant analysis employs mathematical algorithms that attempt to discern all possible combinations of group comparisons, we first outlined the three comparisons of commitment patterns that seemed theoretically germane to this study. They were (1) the factors differentiating high and low dual commitment groups, (2) the variables associated with discerning unilateral commitment patterns, and (3) the factors discriminating between individuals who develop high dual commitment and those who develop unilateral commitment to either a parent firm or a foreign operation.

To examine those comparisons, we first established high and low dual and unilateral commitment groups by cross-tabulating the two measures of commitment. We dichotomized the data into values greater than and less than or equal to the median score (which was the same as the midpoint) on each measure. Table 4 shows the results of a four-group discriminant analysis with rotated correlations (Cooley & Lohnes, 1971; Watson, 1982).

This analysis produced three significant discriminant functions. First, canonical correlation coefficients for each function indicate a moderate association (.46, .32, and .25, respectively) between group membership and the discriminant function. Second, eta-squares indicate a moderate proportion of shared variance for the first function (.21) and a minor proportion of shared variance for the second and third functions (.10 and .06) between group membership and the discriminant function scores. Third, all chi-squares are statistically significant. Finally, a tau score of .37 indicates that an acceptable percentage of cases (56.63) were correctly classified in this four-group analysis. These statistics collectively indicate that the discriminant functions are effective in differentiating individuals holding different commitment patterns during international assignments.

The structure correlations displayed in the top portion of Table 4 indi-

TABLE 4
Structure Correlations and Discriminant Function Statistics

	Commitment Group Comparisons[a]		
Variables	High Dual Versus Low Dual[b]	Unilateral Parent Versus Unilateral Foreign[c]	High Dual Versus Unilateral[d]
Personal			
Tenure in parent company	−.04	.09	.12
Tenure in foreign operation	−.10	−.14	.24
International experience	.22	.15	−.07
Job			
Role discretion	.71	−.05	−.01
Role ambiguity	−.20	−.08	−.63
Role conflict	−.27	.17	−.78
Organizational			
Predeparture training	.15	.60	−.03
Organizational sponsor	−.01	.47	−.06
Clear repatriation practices	.29	.08	.08
Nonjob			
General adjustment to			
host country	.47	−.53	−.18
Interaction with host nationals	.33	−.10	.13
Functional statistics			
Canonical correlation	.46	.32	.25
Eta-square	.21	.10	.06
Wilks's lambda	.67	.85	.94
Chi-square	109.67***	45.32***	17.04*

[a] Table entries are pooled within-groups correlations between canonical discriminant functions and discriminating variables.

[b] A positive correlation indicates a positive relationship with membership in the high dual-commitment group; a negative correlation indicates a positive relationship with membership in the low dual-commitment group.

[c] A positive correlation indicates a positive relationship with membership in the unilateral parent-commitment group; a negative correlation indicates the opposite.

[d] A positive correlation indicates a positive relationship with membership in the high dual commitment group; a negative correlation indicates membership in either unilateral commitment group.

* $p < .05$
*** $p < .001$

cate the specific factors relevant to discriminating commitment patterns in this study. Generally, variables with loadings of less than .30 are disregarded when interpreting discriminant function scores. The structure correlations for the variables related to the function differentiating the high and low dual commitment groups indicate that membership in the high dual commitment group was related to three primary factors: role discretion, general adjustment, and interaction with host country nationals. The structure correlations for the comparisons of the two unilateral commitment groups suggest that managers abroad exhibiting unilateral commitment to their parent companies were more likely to have received predeparture training and to have

organizational sponsors than were those who were unilaterally committed to their local operations. Furthermore, managers with unilateral commitment to their parent firms were also less adjusted to the general foreign cultures than were managers committed unilaterally to their local operations. Finally, the structure correlations for the third function, which differentiates between membership in the high dual commitment group and membership in one of the two unilateral commitment groups, indicate that role ambiguity and role conflict were the central discriminating factors. In other words, individuals experiencing high role ambiguity and conflict in their international assignments were more likely to exhibit unilateral than dual commitment.

DISCUSSION

This study analyzed a current corporate concern: how to get people committed to foreign operations and yet retain their commitment to their parent companies during international assignments. We studied Americans in four Pacific Rim and four Western European countries to examine theorized relationships between personal, job, organizational, and nonjob characteristics and psychological commitments to parent companies and foreign operations. Furthermore, this was the first empirical examination of the potential relationships between all four categories of antecedents and dual organizational commitments in an international context.

Most of the hypotheses received partial support through a relatively conservative statistical test in which we controlled for the shared variance between commitment variables while regressing each commitment variable on all independent variables. These analyses found that tenure in a parent firm and predeparture training were positively associated with commitment to the parent firm, and role conflict and general adjustment to a foreign culture were negatively associated with that commitment. In contrast, role discretion and general cultural adjustment were positively associated with commitment to a foreign operation.

Personal Characteristics and Commitments During International Assignments

In the regression analyses, the only personal variable that had a significant relationship with commitment during international assignments was tenure in a parent company. Becker's (1960) logic of investment-centered commitment may help explain this finding. Individuals in this study had invested more time in their parent firms than in the foreign operations, so their investments in the former were probably the greater. From a practical perspective, these findings suggest that parent firms could facilitate the parent company commitment of managers abroad by selecting people with high tenure for international assignments. It is important to note, however, that although such a selection logic may benefit a firm through sustained commitment to itself and low turnover during the international assignments

(Gregersen & Black, 1990), it may lead to the implementation of policies and practices inappropriate for foreign operations. It may also hinder integration of beneficial policies or practices from foreign operations back into their parent companies since high-tenure managers may be so entrenched in corporate traditions and practices that resist innovation.

Job Characteristics and Commitments During International Assignments

In this research, two of the three job-related variables were particularly relevant to the development of commitment. First, role discretion was a strong correlate of commitment to the foreign operations in the regression analysis, although it was not significantly related to commitment to the parent companies. It appears that high role discretion can provide individuals with an empowering sense of responsibility that may be most relevant to the organization in which that responsibility is carried out. From a practitioner's point of view, these results suggest that multinational firms may want to structure discretion and autonomy into the jobs of managers abroad to enhance development of commitment to their local operations. However, such planned discretion may not be completely necessary because most managers abroad fill executive posts with much inherent freedom, and the positions are geographically distant from headquarters.

Role conflict was also relevant to the development and retention of managers' commitment but exhibited relationships that were the opposite of role discretion's relationships. Role conflict was significantly and negatively related to commitment to a parent company but was unrelated to commitment to a foreign operation. Even though role conflict was correlated with both commitments, the regression analysis suggested that it had a stronger relationship with commitment to the parent company. It is common knowledge that policy and procedural conflicts often occur between parent companies and foreign operations (Bartlett & Ghoshal, 1987; Kobrin, 1987; Phatak, 1974; Prahalad & Doz, 1987); our results suggest that these conflicts are more important to managers' commitment to parent firms than to their commitment to foreign operations. Accordingly, to retain commitment to a parent and limit turnover (Gregersen & Black, 1990), companies may wish to pay more attention to reducing the number of such conflicts.

The results did not support the hypothesized negative relationship between role ambiguity and commitment. It may be that the jobs of the upper-level managers in their overseas assignments studied here are by nature ambiguous, and the managers may accept this ambiguity without a significant effect on commitment.

Organizational Characteristics and Commitments During International Assignments

We expected organizational characteristics to reflect the supportiveness and dependability of parent firms and thus to relate primarily to commitment to them. The regression results somewhat supported this proposition, indicating that a primary form of organizational support was predeparture

culture-related training. This variable had a significant, positive relationship with commitment to a parent firm, even though relatively few respondents had received significant amounts of predeparture culture-related training: 78 percent received zero hours.

Interestingly, the correlational results of this study indicate that the predeparture training provided did not facilitate cross-cultural adjustment ($r = -.16$, $p < .01$). This negative correlation suggests that managers in this study probably did not receive sufficiently rigorous training to facilitate the adjustment process (Black & Mendenhall, 1990). The negative relationship may be a function of too little training, a false sense of security, or inaccurate information derived from it. Whatever the reason, training appeared to inhibit general adjustment even though managers saw its provision as an important form of parent company support.

Nonjob Characteristics and Commitments During International Assignments

Although domestic commitment research has generally ignored nonjob variables (Mowday et al., 1982), the results of this study indicate that they can play a pivotal role in both sustaining commitment to a parent firm and developing commitment to a foreign operation. General cultural adjustment was positively and significantly related to commitment to a local operation as hypothesized. Surprisingly, though, general adjustment also exhibited a significant, negative relationship with commitment to a parent company, pointing to a potential dilemma for multinational enterprises. However, the discriminant analysis showed a positive relationship between adjustment to a foreign environment and high commitment to both a parent firm and a foreign operation, suggesting that adjustment may lead some people to "go native" but may lead others to a sense of dual citizenship. Future research is needed to better determine which individuals go native and which become dual citizens and why and how adjustment to a general host country environment may contribute to both patterns of commitment.

Commitment Patterns During International Assignments

Our initial theoretical interest was the degree of commitment managers exhibited toward parent firms and foreign operations. We then considered the possibility that dual and unilateral commitment patterns exist during international assignments. In general, the results of a discriminant analysis supported the regression and correlation results. Perhaps more important, the discriminant analysis suggested that expatriates can experience either a dual commitment to parent and local operation or a unilateral commitment to one or the other. Global organizations are likely to desire high dual commitment, a pattern that cannot only help managers keep their parent companies' interests in mind during international assignments but can also help them gain respect for and understanding of foreign operations' interests, an understanding they can make use of after repatriation.

The respondents with high dual commitments experienced high role

discretion, significant interaction with host country nationals, and high general adjustment. One important implication of these results is that role discretion is not only related to commitment to a foreign operation, as the regression analyses suggested, but can also enhance dual commitment. Corporate executives might worry that providing high role discretion to geographically distant employees may not result in decisions that are in the best interests of a parent firm; the results of this study may lessen that concern. The combined results seem to indicate that role discretion is more relevant to developing commitment to a foreign operation, but its presence also appears related to the development of effective dual commitment.

Predeparture training, provision of organizational sponsors, and general adjustment marked unilateral commitment. Essentially, managers who exhibited unilateral commitment to their parent companies had failed to adjust to the local cultures in which they were assigned yet perceived their parent firms as quite supportive. In contrast, managers who felt that they were not receiving support from their parent firms and who were adjusted to the foreign cultures developed unilateral commitment to their local operations.

Finally, the discriminant analysis results suggest that role conflict and role ambiguity are central factors for discriminating between respondents with dual and unilateral commitment. Firms that strategically plan international assignments that minimize role conflict and maximize role clarity are more likely to have managers on foreign assignment who exhibit dual rather than unilateral commitment.

General Limitations of the Study

First, the required sampling strategy limited respondents to upper- and middle-level executives, so results may not be generalizable to technicians and nonmanagerial expatriate employees. The latter tend to have international assignments of shorter duration and less job-required social interaction with host nationals than managers (Black & Mendenhall, 1990; Tung, 1982). Second, the findings of this study may be limited to Americans on international assignments. The commitment development process may be quite different for, say, Japanese or Swedish managers living and working in America or Africa. Future studies of internationally assigned managers originating from other countries may provide insight into additional antecedents relevant to organizational commitment and lead to a more generalizable theory of commitment in an international context. Also, two of the attitudinal variables were single-item measures (repatriation clarity and interaction adjustment). If these variables are examined in the future, multiple items are needed to firmly establish stable psychological properties. Finally, the cross-sectional research design of this study clearly eliminated the possibility of testing causal arguments about the antecedents of commitment. Future commitment research should employ longitudinal research designs to overcome this limitation. Furthermore, even though we used some objective measures and designed the questionnaires to reduce the potential for common method variance, the potential for measurement problems existed in this study. For

example, since general adjustment and commitment to a foreign operation were attitudinal variables assessed by the same respondents, common method variance could contribute to the positive relationship found between these two variables. However, if common method variance were problematic, we would have expected an inflated positive relationship between general adjustment and commitment to a parent company as well as a foreign operation, but general adjustment was negatively related to commitment to a parent company. Nevertheless, future empirical research should attempt to gain independent measures of either the dependent or independent variables in order to assess the antecedents of commitment more effectively.

CONCLUSION

The results of this study underscore the importance of assessing multiple commitments in an international context. Our findings also suggest that American managers in the Pacific Rim and Western Europe can develop dual allegiances to their parent companies and local operations or can exhibit unilateral loyalties to either one. Whether or not dual or unilateral commitments develop seems to depend in part on certain personal, job, organization, and nonjob factors. As a consequence, it seems critical for future research to extend understanding of multiple commitments in the international domain through the systematic assessment of such commitments, their various work and nonwork antecedents, and their potentially important outcomes, such as turnover and performance.

REFERENCES

Adler, N. 1986. *International dimensions of organizational behavior.* Belmont, CA: Kent.

Angle, H. L., & Perry, J. L. 1983. Organizational commitment: Individual and organizational differences. *Work and Occupations,* 10: 123–146.

Angle, H. L., & Perry, J. L. 1986. Dual commitment and labor management relationship climates. *Academy of Management Journal,* 29: 31–50.

Aranya, N., Kushnir, T., & Valency, A. 1986. Organizational commitment in a male-dominated profession. *Human Relations,* 39: 433–448.

Bartlett, C. A., & Ghoshal, S. 1987. Managing across borders: New organizational responses. *Sloan Management Review,* 29: 43–53.

Bartol, K. M. 1979. Professionalism as a predictor of organizational commitment, role stress, and turnover: A multidimensional approach. *Academy of Management Journal,* 22: 815–821.

Becker, H. S. 1960. Notes on the concept of commitment. *American Journal of Sociology,* 66: 32–42.

Beehr, T. A., Walsh, J. T., & Taber, T. D. 1976. Relationship of stress to individually and organizationally valued states: Higher-order needs as a moderator. *Journal of Applied Psychology,* 61: 41–47.

Black, J. S. 1988. Workrole transitions: A study of American expatriate managers in Japan. *Journal of International Business Studies,* 19: 274–291.

Black, J. S. 1990. Locus of control, social support, stress, and adjustment in international assignments. *Asia-Pacific Journal of Management,* 7: 1–29.

Black, J. S., & Mendenhall, M. 1990. Cross-cultural training effectiveness: A review and theoretical framework for future research. *Academy of Management Review,* 15: 113–136.

Black, J. S., Mendenhall, M., & Oddou, G. 1991. Toward a comprehensive model of international adjustment: An integration of multiple theoretical perspectives. *Academy of Management Review,* 16: 291–317.

Black, J. S., & Stephens, G. K. 1989. The influence of the spouse on American expatriate adjustment in Pacific Rim overseas assignments. *Journal of Management,* 15: 529–544.

Bowlby, J. 1982. *Attachment.* New York: Basic Books.

Brislin, R. W. 1981. *Cross-cultural encounters.* New York: Pergamon.

Buchanan, B. 1974. Building organizational commitment: The socialization of managers in work organizations. *Administrative Science Quarterly,* 19: 533–546.

Clague, L., & Krupp, N. 1978. International personnel: The repatriation problem. *Personnel Administrator,* 23(4): 29–45.

Cooley, W. W., & Lohnes, P. R. 1971. *Multivariate data analysis.* New York: Wiley.

Copeland, L., & Griggs, L. 1985. *Going international.* New York: Random House.

Crouter, A. 1984. Spillover from family to work: The neglected side of the work-family interface. *Human Relations,* 5: 71–90.

Dawson, S., & Dickinson, D. 1988. Conducting international mail surveys: The effect of incentives on response rates within an industrial population. *Journal of International Business Studies,* 19: 491–496.

Dillman, D. 1978. *Mail and telephone surveys: The total design method.* New York: Wiley.

Etzioni, A. 1961. *A comparative analysis of complex organizations.* New York: Free Press.

Feldman, D. 1976. A contingency theory of socialization. *Administrative Science Quarterly,* 21: 433–452.

Fukami, C. V., & Larson, E. W. 1984. Commitment to company and union: Parallel models. *Journal of Applied Psychology,* 69: 367–371.

Glisson, C., & Durrick, M. 1988. Predictors of job satisfaction and organizational commitment in human service organizations. *Administrative Science Quarterly,* 33: 61–81.

Gomez-Meija, L., & Balkin, D. B. 1987. Determinants of managerial satisfaction with the expatriation and repatriation process. *Journal of Management Development,* 6: 7–17.

Gordon, M. E., & Ladd, R. T. 1990. Dual allegiance: Renewal, reconsideration, and recantation. *Personnel Psychology,* 43: 37–69.

Gordon, M. E., Philpot, J. W., Burt, R. E., Thompson, C. A., & Spiller, W. E. 1980. Commitment to the union: Development of a measure and an examination of its correlates. *Journal of Applied Psychology,* 65: 469–499.

Gregersen, H. B. 1992. Multiple commitments at work and extra role behavior during three stages of organizational tenure. *Journal of Business Research,* in press.

Gregersen, H. B., & Black, J. S. 1990. A multifaceted approach to expatriate retention in international assignments. *Group & Organization Studies,* 15: 461–485.

Hall, R. D. 1986. International joint ventures: An alternative to foreign acquisitions. *Journal of Buyout and Acquisitions,* 4: 39–45.

Harvey, M. G. 1989. Repatriation of corporate executives: An empirical study. *Journal of International Business Studies,* 20: 131–144.

Hawes, F., & Kealey, D. 1981. An empirical study of Canadian technical assistants. *International Journal of Intercultural Relations,* 5: 239–258.

Hofstede, G. 1980. *Culture's consequences.* Beverly Hills, CA: Sage.

Hrebriniak, L. G., & Alutto, J. A. 1972. Personal and role-related factors in the development of organizational commitment. *Administrative Science Quarterly,* 17: 555–572.

Jackson, S. E., & Schuler, R. S. 1985; A meta-analysis and conceptual critique of research on role ambiguity and role conflict in work settings. *Organizational Behavior and Human Decision Processes,* 36: 16–78.

Jobber, D., & Saunders, J. 1988. An experimental investigation into cross-national mail survey response rates. *Journal of International Business Studies,* 19: 483–489.

Kanter, R. M. 1968. Commitment and social organization: A study of commitment mechanisms in utopian communities. *American Sociological Review,* 33: 499–517.

Kendall, D. 1981. Repatriation: An ending and a beginning. *Business Horizons,* 24(6): 21–25.

Kindleberger, C. P., & Audretsch, D. B. (Eds.). 1983. *The multinational corporation in the 1980s.* Cambridge, MA: MIT Press.

Kobrin, S. J. 1987. Expatriate reduction and strategic control in American multinational corporations. *Human Resource Management,* 27: 63–75.

Lachman, R., & Aranya, N. 1986. Evaluation of alternative models of commitments and job attitudes of professionals. *Journal of Occupational Behavior,* 7: 227–243.

Lee, T., & Mowday, R. 1987. Voluntarily leaving an organization: An empirical investigation of Steers and Mowday's model of turnover. *Academy of Management Journal,* 30: 721–743.

Lee, C., & Schuler, R. A. 1982. A constructive replication and extension of a role and expectancy perception model of participation in decision making. *Journal of Occupational Psychology,* 55: 109–118.

Louis, M. R. 1980. Surprise and sense making: What newcomers experience in entering unfamiliar organizational settings. *Administrative Science Quarterly,* 25: 226–251.

Lublin, J. 1989. Grappling with the expatriate issue. *Wall Street Journal,* Dec. 11: B–1.

Luthans, F., McCaul, H. S., & Dodd, N. 1985. Organizational commitment: A comparison of American, Japanese, and Korean employees. *Academy of Management Journal,* 28: 213–218.

Magenau, J. M., Martin, J. E., & Peterson, M. M. 1988. Dual and unilateral commitment among stewards and rank-and-file union members. *Academy of Management Journal,* 31: 359–376.

Marsh, R. M., & Mannari, H. 1977. Organizational commitment and turnover. A prediction study. *Administrative Science Quarterly,* 22: 57–75.

Martin, J. E., & Peterson, M. M. 1987. Two-tier wage structures: Implications for equity theory. *Academy of Management Journal,* 30: 297–315.

Mendenhall, M., & Oddou, G. 1985. The dimensions of expatriate acculturation. *Academy of Management Review,* 10: 39–47.

Morris, J., & Koch, J. 1979. Impacts of role perceptions on organizational commitment, job involvement, and psychosomatic illness among three vocational groupings. *Journal of Vocational Behavior,* 14: 88–101.

Morris, J., & Sherman, J. D. 1981. Generalizability of an organizational commitment model. *Academy of Management Journal,* 24: 512–526.

Mowday, R. T., Porter, L. W., & Steers, R. M. 1982. *Employee-organization linkages: The psychology of commitment, absenteeism, and turnover.* New York: Academic Press.

Near, J. P. 1989. Organizational commitment among Japanese and U.S. workers. *Organization Studies,* 10: 281–300.

O'Reilly, C., A., III, & Chatman, J. 1983. Organizational commitment and psychological attachment: The effects of compliance, identification, and internalization on prosocial behavior. *Journal of Applied Psychology,* 71: 492–499.

Parasuraman, S., Greenhaus, J. H., Rabinowitz, S., Bedeian, A. G., & Mossholder, K. W. 1989. Work and family variables as mediators of the relationship between wives' employment and husbands' well-being. *Academy of Management Journal,* 32: 185–201.

Phatak, A. V. 1974. *Managing multinational corporations.* New York: Praeger.

Podsakoff, P. M., & Williams, L. J. 1986. The relationship between job performance and job satisfaction. In E.A. Locke (Ed.), *Generalizing from laboratory to field settings:* 207–253. Lexington, MA: Lexington Books.

Porter, L. W., & Lawler, E. E., III. 1968. *Managerial attitudes and performance.* Homewood, IL: Irwin.

Porter, L. W., Lawler, E. E., III, & Hackman, J. R. 1975. *Behavior in organizations.* New York: McGraw-Hill.

Porter, L. W., & Smith, F. J. 1970. *The etiology of organizational commitment.* Unpublished paper, University of California, Irvine.

Prahalad, C. K., & Doz, Y. L. 1987. *The multinational mission: Balancing local demands and global vision.* New York: Free Press.

Price, J. I. 1977. *The study of turnover.* Ames: Iowa State University Press.

Reichers, A. 1985. A review and reconceptualization of organizational commitment. *Academy of Management Review,* 10: 465–476.

Reichers, A. 1986. Conflict and organizational commitments. *Journal of Applied Psychology,* 71: 508–514.

Ritzer, G., & Trice, H. A. 1969. An empirical study of Howard Becker's side-bet theory. *Social Forces,* 47: 459–479.

Rizzo, J. R., House, R. J., & Lirtzman, S. I. 1970. Role conflict and ambiguity in complex organizations. *Administrative Science Quarterly,* 2: 150–163.

Rotundi, T. 1975. Organizational identification and group involvement. *Academy of Management Journal,* 18: 892–897.

Salancik, G. R. 1977. Commitment and the control of organizational behavior and belief. In B.M. Staw & G.R. Salancik (Eds.), *New directions in organizational behavior:* 1–54. Chicago: St. Clair Press.

Sanford, N. 1955. The dynamics of identification. *Psychological Review,* 62: 106–118.

Scott, W. R. 1981. *Organizations: Rational, natural, and open systems.* Englewood Cliffs, NJ: Prentice-Hall.

Sheldon, M. E. 1971. Investments and involvements as mechanisms producing commitment to the organization. *Administrative Science Quarterly,* 16: 142–150.

Steers, R. M. 1977. Antecedents and outcomes of organizational commitment. *Administrative Science Quarterly,* 22: 46–56.

Stevens, T. A., Beyer, J., & Trice, H. M. 1978. Assessing personal, role, and organizational predictors of managerial commitment. *Academy of Management Journal,* 21: 380–396.

Stewart, R. 1982. A model for understanding managerial jobs and behaviors. *Academy of Management Review,* 7: 7–14.

Stoke, S. 1950. An inquiry into the concept of identification. *Journal of Genetic Psychology,* 76: 163–189.

Stumpf, S. A., & Hartman, K. 1984. Individual exploration to organizational commitment or withdrawal. *Academy of Management Journal,* 27: 308–329.

Tolman, E. 1943. Identification and the post-war world. *Journal of Abnormal Social Psychology,* 38: 141–148.

Torbiorn, I. 1982. *Living abroad.* New York: Wiley.

Tuma, N. B., & Grimes, A. J. 1981. A comparison of models of role orientations of professionals in a research-oriented university. *Administrative Science Quarterly,* 26: 187–206.

Tung, R. 1981. Selecting and training of personnel for overseas assignments. *Columbia Journal of World Business,* 16(1): 68–78.

Tung, R. L. 1982. Selection and training procedures of U.S., European, and Japanese multinationals. *California Management Review,* 25(1): 57–71.

Tung, R. 1988. Career issues in international assignments. *Academy of Management Executive,* 2(3): 241–244.

Watson, C. J. 1982. Approaches for the interpretation of multiple discriminant analysis in organizational research. *Academy of Management Review,* 7: 124–132.

Weiner, Y. 1982. Commitment in organizations: A normative view. *Academy of Management Review,* 7: 418–428.

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TOP MANAGEMENT TEAM DEMOGRAPHY AND CORPORATE STRATEGIC CHANGE

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This study examined the relationship between the demography of top management teams and corporate strategic change, measured as absolute change in diversification level, within a sample of *Fortune* 500 companies. Controlling for prior firm performance, organizational size, top team size, and industry structure, we found that the firms most likely to undergo changes in corporate strategy had top management teams characterized by lower average age, shorter organizational tenure, higher team tenure, higher educational level, higher educational specialization heterogeneity, and higher academic training in the sciences than other teams. The results suggest that top managers' cognitive perspectives, as reflected in a team's demographic characteristics, are linked to the team's propensity to change corporate strategy.

The ability of an organization to anticipate and respond to opportunities or pressures for change, both internal and external, is one of the most important ways in which its competitiveness and viability are ensured. The nature and effectiveness of organizational responses vary in part with how top management triggers and interprets strategic issues (Dutton & Duncan, 1987; Kiesler & Sproull, 1982). Management's role in defining the "developments and events which have the potential to influence the organization's current or future strategy" (Dutton & Duncan, 1987: 280) provides a major link between a firm and its external environment.

This inquiry examined the link between top management teams and corporate strategic change, defined as absolute change in diversification level. By focusing on top management teams, we followed the tenets of the strategic choice perspective (e.g., Andrews, 1971; Child, 1972) rather than the more deterministic assumptions of population ecology (Aldrich, 1979; Aldrich & Pfeffer, 1966; Hannan & Freeman, 1977) or "life cycle" models (Greiner, 1972; Quinn & Cameron, 1983). A firm's top management team—the "dominant coalition" of individuals responsible for setting firm direction (Cyert & March, 1963)—identifies environmental opportunities and problems, interprets relevant information, considers organizational capabil-

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ities and constraints, and formulates and implements strategic change (Mintzberg, 1979). Thus, an examination of what influences how executives assess and direct firm strategy is an important area of investigation.

Our interest in the role of top management teams, as opposed to that of individual leaders, is consistent with recent emphasis in the strategy field. In large, complex organizations, managerial responsibilities are unlikely to be the exclusive domain of just one individual (Drucker, 1974). Hambrick and Mason (1984), with their "upper echelon" perspective, proposed examining the relationship between top management teams and the organizational outcomes of strategic choices and performance levels. Similarly, Gupta (1988) suggested that a stronger relationship with strategy will be found if top management teams, rather than CEOs, are analyzed. Recent studies have found a link between top management teams and such organization-level issues as strategic innovation and performance (Bantel & Jackson, 1989; Murray, 1989; Norburn & Birley, 1988; O'Reilly & Flatt, 1989).

In examining the management-strategic change link, this study viewed top teams as decision-making groups. Decisions related to changing strategy result from the interactions of group members; the type and variety of cognitive perspectives represented on a team shape those interactions. Thus, our specific focus was the link between the type and variety of top team members' cognitive perspectives, as measured using a demographic approach, and strategic change.

THE LINK BETWEEN TOP MANAGEMENT TEAM DEMOGRAPHY AND CORPORATE STRATEGIC CHANGE

Corporate Strategic Change

The formulation of strategy entails aligning a firm's strengths and weaknesses with the problems and opportunities in its environment (Andrews, 1971). As the strategic decision-making process is by its very nature ambiguous, complex, and unstructured, the perceptions and interpretations of a top management team's members critically influence strategic decisions (Dutton & Duncan, 1987). A team's decision to initiate changes in strategy will be based on members' perceptions of opportunities and constraints (Tushman & Romanelli, 1985).

Tushman and Romanelli (1985) pointed out that the internal coordination requirements associated with a firm's strategy increase structural elaboration, which creates inertia that promotes maintaining the status quo, even if such clear dysfunctional consequences as performance downturns are present. Such inertia will decrease the probability of a team's perceiving the need for fundamental change (Normann, 1977). Thus, a top management team must be proactive in its role of overcoming inertia if strategic change is to be initiated.

The characteristics of a team expected to be proactive in initiating strategic change include receptivity to change, willingness to take risk, diversity in information sources and perspectives, and creativity and innovativeness

in decision making. Receptivity to change suggests an openness to pursuing different business approaches, essential to strategic change. Willingness to take risk is important because changing firm strategy involves risk: established ways of conducting business are abandoned in favor of making commitments to strategic directions for which the payoffs are not guaranteed. Novelty, and therefore change, result from a creative, innovative decision-making style. Finally, diversity in information sources and perspectives suggests differentiation in an organization's belief structure that in turn leads to a perception of the feasibility of change and a momentum toward change (Dutton & Duncan, 1987).

As depicted in Figure 1, a team's demographic composition is a key indicator of these four tendencies. Specifically, certain demographic traits suggest receptivity to change and willingness to take risks, while demographic heterogeneity indicates diversity of information sources and perspectives and creativity and innovativeness in decision making.

The focus of this research was changes in corporate rather than business-level strategy. This distinction is an important one in strategy research. Strategy at the business level constitutes decisions regarding the methods of competition within a specific industry. By contrast, corporate strategy pertains to decisions on the mix and emphases of business within a portfolio. Corporate strategy includes the evaluation of the appropriate courses of action with regard to potential divestments, downsizings, and restructurings of existing businesses, as well as to acquisitions, mergers, and the internal development of new business units. Therefore, absolute change in the level of corporate diversification, the measure used in this study, is an accurate reflection of strategic change.

FIGURE 1
Top Management Team Demography and Corporate Strategic Change
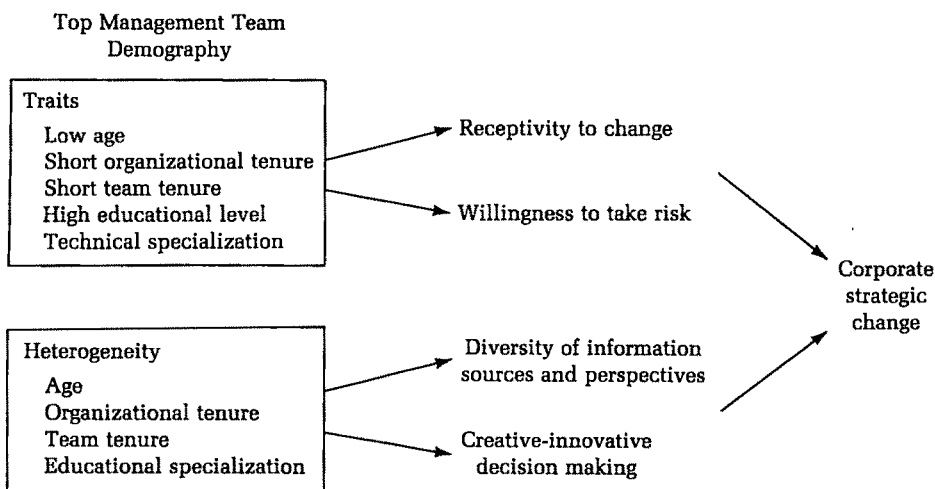
The Link Between Demography and Cognitive Perspectives

As a top team engages in the strategic decision-making process, each manager's perceptions and interpretations will reflect his or her own "cognitive base." Previous research has defined a cognitive base as assumptions about future events, knowledge of alternatives, and the consequences attached to alternatives (Hambrick & Mason, 1984; March & Simon, 1958). Drawing on Hambrick and Snow (1977), Hambrick and Mason (1984) proposed a model of how a manager's cognitive base influences the perceptual process underlying decision making. First, it limits the manager's field of vision, or the areas in the environment to which attention is directed. Second, selective perception occurs because the manager only pays attention to some of the stimuli in his or her field of vision. And third, the information that is processed is filtered through the lens of the cognitive base.

In its role of setting the strategic direction of a firm, a top management team functions as a decision-making group. We thus examined the type and variety of cognitive bases represented by top team members in the strategic decision-making process. According to the Hambrick and Mason (1984) model, a study of the cognitive bases of team members will suggest the nature of a team's information gathering and processing and the number and variety of solutions generated.

Because an individual's cognitive base evolves from experiences, including training and background (Cyert & March, 1963), demographic characteristics are indicators of its qualities (Hambrick & Mason, 1984). Previous studies have used demography as a predictor of beliefs and values (Kahalas & Groves, 1979; Walsh, 1988) and viewpoints (Dearborn & Simon, 1958). The demographic approach builds on research that has found a link between demographic characteristics and specific beliefs, values, and abilities. For example, age has been found to be negatively related to the ability to integrate new information (Taylor, 1975) and to make risky decisions (Carlson & Karlsson, 1970; Vroom & Pahl, 1971).

Demography theory, since first applied to general populations, has generated considerable interest because of its theoretical importance in the study of organizations (Stinchcombe, McDill, & Walker, 1968). Pfeffer described the importance of the demographic approach as follows: "Demography is an important, causal variable that affects a number of intervening variables and processes and, through them, a number of organizational outcomes" (1983: 350). He argued that demography might explain more variance in the dependent variable than would the presumed intervening constructs, which are often such underlying mental processes as attitudes toward risk. This superiority might be due in part to the fact that some characteristics of interest do not have analogous psychological measures (Hambrick & Mason, 1984). For example, a manager's team tenure suggests interaction patterns with colleagues that might be difficult to tap with a psychological measure. Further advantages of demography are objectivity,

parsimony, comprehensibility, logical coherence, predictive power, and testability (Hambrick & Mason, 1984; Pfeffer, 1981).

In understanding the influence of team demography on strategic decision outcomes, it is important to differentiate between trait and diversity effects. This concern follows research on group problem solving that has suggested that both the characteristics, or traits, and the variety, or diversity, of cognitive resources are central to understanding group performance (Hoffman, 1959; Hoffman & Maier, 1961; Triandis, Hall, & Ewen, 1965).

Demographic trait effects. With regard to trait effects, the extent to which a member has a certain demographic characteristic predicts his or her perspective and interpretations. For example, a variety of research studies have shown that certain demographic variables can be linked to an individual's receptivity to change. Several studies have found a link between long tenure and high commitment to the status quo (Alutto & Hrebiniak, 1975; Staw & Ross, 1980; Stevens, Beyer, & Trice, 1978). As our interest was the strategic decision making of teams, we used the average level of a given demographic trait in a team to represent the group's overall perspective. As Figure 1 indicates, certain demographic traits suggest a team's receptivity to change and willingness to take risks. This link will be elaborated in the hypotheses section.

Demographic diversity effects. Diversity effects, which refer to the relative homogeneity or heterogeneity of a team on a characteristic, suggest the breadth of perspective available in a decision-making process. As shown in Figure 1 and described below, team demographic heterogeneity suggests diversity in information sources and perspectives and creativity and innovativeness in decision making.

Research has suggested that a team's demographic *homogeneity* will be linked to its propensity to maintain the strategic status quo. Homogeneity on demographic traits leads to perceptions of similarity with and attraction to others (Byrne, 1961; Kanter, 1977; Pfeffer, 1981). Shared cohort membership, which implies that two or more people experience an event like birth or organizational entry within the same time interval (Ryder, 1965), indicates similar exposure to social, environmental, and organizational events. A shared language develops among individuals with similar experiences, backgrounds, beliefs, and values (Allen & Cohen, 1969; Rhodes, 1983), enhancing communication frequency and integration (O'Reilly, Caldwell, & Barnett, 1989; Wagner, Pfeffer, & O'Reilly, 1984; Zenger & Lawrence, 1989).

Solidarity, sponsorship, and mutual choice are likely to occur among similar individuals (Pfeffer, 1983), leading to congruence in beliefs and perceptions of a firm and how it operates (Tushman & Romanelli, 1985; Wagner et al., 1984) and to high consensus (Dutton & Duncan, 1987) and continuity (Reed, 1978) in decision making. Such congruence can be particularly functional when high interdependence characterizes a firm's diversification posture, demanding integration among top team members. Michel and Hambrick (1992) found a positive association between team homogeneity and

performance for vertically integrated and related-diversified firms; no such relationship existed for firms with unrelated diversification.

Homogeneous groups can also be expected to exhibit conformity and lack of openness to information. Social psychological research on decision-making groups has shown that members' perceptions of similarity with others, particularly on values, beliefs, and attitudes, increases group identification and cohesion (Byrne & Wong, 1962; Lott & Lott, 1965; Rokeach, 1960; Zander, 1977). Cohesiveness is in turn associated with high conformity (Back, 1951; Janis, 1972; Kiesler & Kiesler, 1969; Lott & Lott, 1961, 1965; Zander, 1977), high commitment to prior courses of action (Janis, 1972), lack of openness to information, and interference with a group's ability to fully use information (Whitney & Smith, 1983).

In contrast, demographic heterogeneity represents diversity in a team's cognitive bases. According to Hambrick and Mason's (1984) model, a heterogeneous team will gather information from a variety of sources and have diverse interpretations and perspectives. Dutton and Duncan (1987) posited that differentiation in an organization's belief structure, defined as high complexity with low consensus, enhances the search for information, the perception that change is feasible, and the momentum for change. Other theorists have also suggested that high member diversity and variety enhance the ability of an organization to adapt (Katz, 1982; Weick, 1969).

Group heterogeneity has also been shown to be associated with high levels of creativity and innovation (Bantel & Jackson, 1989; Katz, 1982; Murray, 1989; Wanous & Youtz, 1986). The presumed benefit of a diverse group is that its members' different points of view lead to diversity, novelty, and comprehensiveness in the set of recommended solutions. The members of such a team will be able and willing to challenge each others' viewpoints (Hoffman & Maier, 1961). Researchers have suggested that a need to reconcile diverse solutions and viewpoints stimulates effective group discussion and, in turn, high-quality decisions (Ghiselli & Lodahl, 1958; Hoffman, 1959; Hoffman & Maier, 1961; Sorenson, 1968).

Organizational theorists have also pointed out, however, that diversity within a group on the demographic variables of age and organizational tenure has its costs. Group members who are not in the same cohorts, for example, find it more difficult to communicate than do same-cohort members (McCain, O'Reilly, & Pfeffer, 1983), making conflict and power struggles more likely (Pfeffer, 1983). At high levels of diversity, communication will become increasingly strained and conflict laden. A potential outcome would be the inability of a group to make decisions or take action.

These findings suggest that the benefits of group diversity in demographic characteristics taper off as heterogeneity increases. In fact, very high levels of heterogeneity may actually have negative organizational consequences. Thus, we expected that increases in demographic heterogeneity within a group would have the strongest association with strategic change at moderate levels of heterogeneity.

HYPOTHESES

Five demographic variables were chosen for study: age, organizational tenure, team (executive) tenure, educational level, and educational specialization. Previous research has shown that these variables are indicators of attitudes about change and risk taking and are thus relevant to the trait hypotheses we will state. In addition, the selected variables suggest a certain type of decision-making perspective, relevant to the heterogeneity hypotheses.

Age

An individual's age is expected to influence strategic decision-making perspectives and choices. Hitt and Tyler (1991), for example, found that executives' ages had an influence on the strategic evaluation of acquisition candidates. Research has suggested that flexibility decreases and rigidity and resistance to change increase as people age. To older executives, security, both financial and career, may become very important. They might thus avoid risky decisions (Carlson & Karlsson, 1970; Vroom & Pahl, 1971), which could include major changes in the strategic direction of a firm. Younger managers, on the other hand, tend to be more risk oriented; low executive age has been associated with both corporate growth (Child, 1974; Hart & Mellons, 1970) and volatility of sales and earnings.

Older managers also tend to have less confidence in their decisions and are willing to change their views if they become aware of a negative consequence (Taylor, 1975). As a result, such managers may lack the conviction necessary to provide the leadership for strategic change.

> *Hypothesis 1a: Average age of a top management team will be negatively related to change in corporate strategy.*

As discussed earlier, research investigating the role of cohorts in firms has focused for the most part on the variables of age and organizational tenure (e.g., McCain et al., 1983; Wagner et al., 1984). Age is an important demographic variable in that it helps to predict an individual's non—work-related experiences (Ryder, 1965); people of a similar age have such experiences in common, which leads to shared attitudes and beliefs (Rhodes, 1983). Diversity of age is expected to increase the variety of perspectives on strategic issues facing a firm, thus stimulating the consideration of change. The benefits of increased age diversity will be greater at moderate levels and will taper off the more heterogeneous in age a top management team becomes.

> *Hypothesis 1b: Age heterogeneity within a top management team will be positively related to change in corporate strategy, but the association will decrease the more heterogeneous the team.*

Organizational Tenure

Higher commitment to the status quo (Alutto & Hrebiniak, 1975; Staw & Ross, 1980; Stevens et al., 1978) and to the values of a firm (Schmidt & Posner, 1983) are likely to be associated with long organizational tenure. Miller (1991) found that firms with long-tenured CEOs were less likely to have appropriate strategies and structures that matched their environmental requirements. Social cohesion is also expected to result in a team with high organizational tenure (Michel & Hambrick, 1992), leading to a reluctance to challenge the status quo (Janis, 1972). In addition, long tenure increases understanding of organizational policies and procedures (Kanter, 1977) and perhaps reluctance to change such structures.

Although we might thus expect a positive relationship between low organizational tenure and strategic change, research has suggested that this association is not straightforward. In their study of the effects of group demographics on communication frequency, Zenger and Lawrence (1989) found that organizational tenure was not a significant predictor of within-group communication frequency, yet it was significant in determining outside-group communication frequency. They postulated that small groups in which work-related knowledge and skills develop rapidly assimilate new entrants quickly. Assuming that assimilation into the routines and perspectives of a top management team is rapid, we posited that only teams with low average organizational tenure are likely to bring about changes in corporate strategy.

> Hypothesis 2a: *Low average organizational tenure of a top management team will be positively related to change in corporate strategy.*

Organizational tenure, by defining an individual's cohort membership, indicates experiences, perspectives, and values. Experiences inside an organization produce a common vocabulary and similar interpretations of events (Allen & Cohen, 1969; Lawrence & Lorsch, 1967), which facilitate communication among individuals (March & Simon, 1958). Thus, a team's heterogeneity in organizational tenure should lead to diverse opinions and stimulate consideration of changes in strategy. Increases in diversity are most likely to have the greatest effect at low levels.

> Hypothesis 2b: *Organizational tenure heterogeneity within a top management team will be positively related to change in corporate strategy, but the association will decrease the more heterogeneous the team.*

Top Management Team Tenure

Time of entry into a group is an important determinant of a person's communication patterns within it (Allen & Cohen, 1969). In his study of R&D project groups, Katz (1982) found that groups that had been together a long time tended to develop standardized ways of communicating and homoge-

neity in perspective. Long average group tenure results in decreasing levels of overall communication because group members feel they can anticipate other members' viewpoints and increased specialization occurs (Katz, 1982). In addition, team longevity can lead to increasing isolation from outside sources of information (Pelz & Andrews, 1966) as members become less receptive toward communications that threaten their patterns of behavior (Staw, 1977). We thus expected that long-tenured groups will become increasingly resistant to changes in strategic direction.

> *Hypothesis 3a: Average tenure of a top management team will be negatively related to change in corporate strategy.*

Heterogeneity of team tenure indicates that the various members of a top management team have been promoted at different times, suggesting that new and different perspectives on the strategic vision for the firm have been added. Team tenure homogeneity, by contrast, suggests shared socialization and group experiences that reinforce the cohort phenomenon. Thus, we expected heterogeneity of top management team tenure to provide a variety of information sources and outlooks.

> *Hypothesis 3b: Tenure heterogeneity within a top management team will be positively related to change in corporate strategy, but the association will decrease the more heterogeneous the team.*

Education

Educational level. Level of education reflects an individual's cognitive ability and skills. High levels are associated with high capacity for information processing and ability to discriminate among a variety of stimuli (Schroder, Driver, & Streufert, 1967). Educated individuals are likely to engage in boundary spanning, tolerate ambiguity, and show an ability for "integrative complexity" (Dollinger, 1984: 354). Further, high levels of education have consistently been associated with receptivity to innovation (Becker, 1970; Kimberly & Evanisko, 1981; Rogers & Shoemaker, 1971). Bantel and Jackson (1989) found that top management teams with high levels of education headed innovative banks. We thus expected individuals with high levels of education to be aware of and receptive to the need for change in corporate strategy.

> *Hypothesis 4: Average educational level of a top management team will be positively related to change in corporate strategy.*

Educational specialization. Selection of a curriculum of study reflects an individual's cognitive style and personality (Holland, 1973), and the curriculum pursued shapes perspectives and outlooks. Hitt and Tyler (1991), for example, found that the type of academic degrees executives had influenced their strategic decision making, specifically their evaluation of acquisition candidates. Certain academic fields are more oriented toward change

than others. For example, science and engineering are concerned with progress, invention, and improvement. We explored the possibility that those disciplines might be more strongly associated with strategic change than the arts, law, and business.

> *Hypothesis 5a: Academic specialization in science and engineering within a top management team will be positively related to change in corporate strategy.*

Heterogeneity of educational curriculum within a team is likely to broaden perspectives on strategic decision making.

> *Hypothesis 5b: Educational specialization heterogeneity within a top management team will be positively related to change in corporate strategy.*

Control Variables

Three variables—prior organizational performance, organizational size, and top management team size—were included as controls because of their potential influence on strategic change. In addition, we included three industry structure variables that might account for changes in firms' corporate diversification strategies.

Prior organizational performance. Tushman and Romanelli (1985) pointed out that low organizational performance results when a firm's strategy fails to achieve an appropriate alignment with its environment. Thus, poor performance is often the impetus for changes in strategy (Hambrick & Schechter, 1983; Tushman & Romanelli, 1985), particularly as top managers often feel more vulnerable to unfriendly takeovers, internal upheavals, and losing their jobs when performance is poor (James & Soref, 1981). Evidence suggests that changes in strategy can bring about desired performance improvements. Schendel, Patten, and Riggs (1975) examined firms that suffered performance declines followed by turnarounds. For firms that experienced declines brought about by such strategic issues as product obsolescence, strategic change was associated with the turnarounds. We thus expected a relationship between poor organizational performance and corporate strategic change.

Organizational size. Increases in organizational size add complexity with its attendant increases in structural elaboration and formalized systems for planning, control, and resource allocation (Quinn & Cameron, 1983). As a result, increases in organizational size can create progressively stronger resistance to fundamental change (Tushman & Romanelli, 1985). Largeness should thus be associated with a low likelihood of major changes in corporate strategy.

Top management team size. Group size is likely to influence measures of demographic heterogeneity, since large groups have more potential for dissimilarity. In a small group, the addition of one person can increase team heterogeneity substantially (Bantel & Jackson, 1989). As the number of members on a top management team increases, structural elaboration is expected

(Meyer, 1972), including differentiation in perspective (Dearborn & Simon, 1958), specialization of skills, and diversity of opinion (Bales & Borgatta, 1955). Such breadth of team perspective should stimulate proactive strategic actions. Eisenhardt and Schoonhoven (1990), for example, found that large teams facilitate growth for new ventures. We thus expected firms with large top management teams to exhibit high corporate strategic change.

However, as team size increases, group cohesion and communication intensity become strained (Shaw, 1976). Thus, at low-to-moderate levels of largeness, a positive association with corporate strategic change is expected; the association will taper off as a team becomes very large.

Industry structure. Contributors to the strategy literature have noted that characteristics of industry structure may provide incentives for firms to pursue changes in their diversification postures (Hoskisson & Hitt, 1990; Reed & Luffman, 1986). Similarly, economists have noted that industry structure variables may determine a firm's diversification strategy (e.g., Lecraw, 1984). A review of the literature suggested three industry structure characteristics that should be examined: growth, profitability, and concentration.

Changes in diversification strategy may be defensive moves by management to mitigate undesirable characteristics in a firm's dominant industrial environment. In response to poor growth and profit opportunities in their core businesses, firms are likely to pursue opportunities elsewhere (Ansoff, 1965; Bass & Wittink, 1978; Berry, 1975; Gort, 1962; Rumelt, 1974). Firms can satisfy their profit and growth goals without changing their diversification strategies when operating in industries characterized by high growth with above-average profitability and below-average risk (Ansoff, 1965; Lecraw, 1984).

In addition, the economic concentration of an industry may influence the likelihood of strategic change. Montgomery (1979) found that firms in highly concentrated industries were likely to experience higher market shares and the associated higher returns than firms in other industries. As a result, we expected firms in highly concentrated industries to exhibit less strategic change than firms in less concentrated industries.

Low industry growth, profitability, and concentration were thus expected to be associated with high levels of corporate strategic change.

METHODS

Sample

A random sample of 100 firms was selected from the 500 largest manufacturing firms for the year 1980 as listed in *Fortune*. We chose 1980 because of the availability of TRINET line-of-business data and because the subsequent years were an active period for corporate acquisitions and divestitures as indicated by a review of the *Journal of Mergers & Acquisitions* for the years 1981–83. In addition, TRINET line-of-business data were available for 1980 and 1983. TRINET, a data base made available by Economic Information Systems (EIS) and derived from the EIS establishment/company

TABLE 1
Firms and Their Primary Lines of Business

Company	Primary Line of Business
A. E. Staley Manufacturing Co.	Corn syrups
A. O. Smith Corp.	Auto and truck frames
Akzona Corp.	Man-made fibers
Allied Corp.	Chemicals
Allis-Chalmers Corp.	Farm machinery
Amax Inc.	Base metals
American Can Co.	Metal cans
American Cyanamid Co.	Medical drugs
Amstar Corp.	Sweeteners
Arcata Corp.	Printing
Armco Inc.	Carbon steel
Avon Products Inc.	Cosmetics
Barnes Group Inc.	Springs
Bausch & Lomb	Contact lenses
Bell & Howell Co.	Specialized business equipment
Burlington Industries Inc.	Fabrics
Cameron Iron Works Inc.	Iron and steel forgings
Carpenter Technology Corp.	Stainless steel
Caterpillar Tractor Co.	Construction machinery
Certainteed Corp.	Roofing materials
Cooper Industries Inc.	Hand tools
Copperweld Corp.	Steel tubing
Crown Central Petroleum Corp.	Petroleum refining
Data General Corp.	Computers
Deere & Co.	Farm machinery
Dexter Corp.	Industrial coatings
Diamond International Corp.	Packaging
Dorchester Gas Corp.	Natural gas
EG&G Inc.	Engineering and scientific instruments
Eagle-Picher Industries Inc.	Transportation equipment components
Emerson Electric Co.	Electric motors
Ethyl Corp.	Industrial inorganic chemicals
Ex-Cell-O Corp.	Machine tools
Fieldcrest Mills Inc.	Textile products
Figgie International Inc.	General industrial machinery
Frederick & Herrud Inc.	Prepared meat products
G. D. Searle & Co.	Pharmaceuticals
GAF Corp.	Photography equipment
General Instrument Corp.	Electronic components
General Motors Corp.	Motor vehicles
Geo A. Hormel & Co.	Meat processing
Georgia-Pacific Corp.	Plywood
Great Northern Nekoosa Corp.	Paper
Gulf Resources & Chemical Corp.	Lead, zinc
Harris Corp.	Printing equipment
Hewlett-Packard Co.	Test and measurement instruments
IC Industries Inc.	Railroads
Insilco Corp.	Silverware
Intel Corp.	Semiconductors

TABLE 1 (continued)

Company	Primary Line of Business
International Harvester Co.	Agricultural equipment
International Minerals & Chemicals	Fertilizers
International Multifoods Corp.	Flour
Johnson Controls Inc.	Automatic controls
Joseph E. Seagram & Sons	Liquors and wines
L. B. Foster Inc.	Iron and steel forgings
Lone Star Industries Inc.	Cement and concrete
MAPCO Inc.	Petroleum pipelines
Mead Corp.	Forest products
Mitchell Energy & Development Corp.	Natural gas
Monsanto Co.	Synthetic fibers
Oak Industries Inc.	Telecommunication switches
PACCAR Inc.	Heavy-duty trucks
Palm Beach Inc.	Men's apparel
Phillips Petroleum Co.	Petroleum
Pitney Bowes Inc.	Office machines
Quaker Oats Co.	Cereals
Revere Copper & Brass Inc.	Fabricated copper and brass
Scott Fetzer	Vacuum cleaners
Scovill Inc.	Door bells
Signode Industries Inc.	Steel and plastic strappings
Southwest Forest Industries	Lumber
Spring Mills Inc.	Woven fabrics
Sun Co.	Petroleum
Tecumseh Products Inc.	Refrigerator compressors
Tyson Foods Inc.	Poultry products
Varian Associates Inc.	Microwave and power tubes
Vulcan Materials Co.	Crushed aggregate
Warnaco Inc.	Women's apparel
Warner Communications Inc.	Motion pictures
West Point-Pepperell Inc.	Cotton fabrics
Westinghouse Electric Corp.	Motors, controls, breakers
Westvaco Corp.	Paper products
Whittaker Corp.	Metal pipe
Williamette Industries Inc.	Paper products
Witco Chemical Corp.	Defoamers
Wyman-Gordon Co.	Nonferrous and iron forgings
Xerox Corp.	Copiers

files, provides information on numbers of employees, revenues, and the four-digit Standard Industrial Classification (SIC) codes for all plants employing 40 or more persons in the United States. We aggregated those data for each firm to arrive at line-of-business data, which indicate the percentages of a firm's total sales represented by each of its four-digit SIC codes and allows identification of changes in corporate strategy.

The sample was reduced to 87 firms because TRINET data were unavailable for 13 of the firms. Table 1 identifies the final sample of firms and their primary lines of business, defined as the four-digit SIC code with the

largest percentage of revenues. A sample of firms selected from the *Fortune 500* represents companies already quite diversified in their strategic postures and operating in a variety of industries (Rumelt, 1982), as evidenced by the variety of lines of business represented. By selecting a multiindustry sample, we controlled for industry-specific effects.

Definition and Measurement of the Variables

Demography measures. For each firm, only data for managers on the top management team were collected. We defined top management team members as including the very highest level of management—the chairman, chief executive officer, president, and chief operating officer—as well as the next-highest tier. The exact titles in the second executive level vary from executive vice president to vice president, depending on the organization. The arbitrary use of a position title, such as vice president, to define top management team membership can lead to the inclusion of anywhere from two to five levels of management. By defining the top management team as the two highest executive levels, regardless of the titles used, we achieved greater consistency across the sample of firms than have other studies in the measurement of the top management team.

Demographic characteristics were collected for members of the 1980 top management team of each firm as listed in the *Dun & Bradstreet Reference Book of Corporate Managements, 1980.* We calculated age, organizational tenure, and top management team tenure from biographical data. Educational level was measured in terms of the number of years of schooling, and the specialization represented by the highest obtained university degree determined the educational specialization measure. In categorizing managers by their fields of educational specialty, we used information provided by Dun & Bradstreet and *Who's Who in Finance and Industry* (Marquis Who's Who, Inc., 1981). Individuals were categorized into five educational specializations: arts, sciences, engineering, business and economics, and law. Individuals with B.S. or M.S. degrees were classified as science specialists; B.S. and M.S. degrees with a listed specialty, such as business, were not coded as science degrees. Individuals with Ph.D. degrees in the sciences were classified as science specialists.

The demographic trait measures for interval scaled data were calculated by aggregating values for a team's members and taking the mean. For the measure of organizational tenure, we created a dummy variable to capture low tenures, consistent with Hypothesis 2a. The cutoff point for low organizational tenure was the mean tenure for the sample minus one standard deviation. This resulted in 11.5 (19.98 − 8.48) years as a cutoff. We then divided the sample into firms with teams with mean organizational tenures of (1) less than 11.5 years and (2) more than or equal to 11.5 years. We classified 11 firms as having top management teams with low average organizational tenures.

For educational specialization, we categorized each team on the basis of

its members' mode specialization and then developed a dummy variable to capture top management teams dominated by individuals with educational backgrounds in science and engineering.

Heterogeneity of the top management team on the interval scaled data was measured using the coefficient of variation, defined as the standard deviation divided by the mean. Allison's (1978) review of inequality measures indicates that the coefficient of variation, because it is a scale invariant measure, is preferred to the standard deviation or variance for interval-level variables. Scale invariant measures are desirable because they are sensitive to relative rather than absolute differences. When multiplied by a constant, a scale invariant measure remains unchanged; when added to a constant, it declines. These properties are desirable for ranking one distribution as more unequal than another (Allison, 1978).[1]

The logarithm of the heterogeneity measure was used to capture the anticipated decreasing rate of the effect of dissimilarity in age, organizational tenure, and top management team tenure on changes in corporate strategy. For the categorical variable, educational specialization, we applied Blau's (1977) index of heterogeneity.[2]

Strategic change measure. Strategic change was measured by the absolute percentage change in diversification strategy over the period 1980–83. A firm's diversification posture captures the moves its management has made to establish business positions in different industries (Porter, 1987). The concept of corporate diversification captures the variety and relative distribution of a firm's lines of business (Rumelt, 1974). Management can choose to alter a firm's diversification strategy by adding new business activities, dropping or divesting existing business activities, or pursuing corporate growth through expansion in its existing lines of business. A firm's growth pattern and the composition of its business portfolio will reflect decisions on the amount of resources allocated to specific areas.

Corporate diversification strategy was measured with Jacquemin and Berry's (1979) entropy measure of diversification, which captures both the extent of diversity across a firm's activities and the related versus unrelated elements of diversity (Palepu, 1985). It is calculated as follows:

$$\sum_{i=1}^{N} P_i \ln(1/P_i)$$

where P_i is the percentage of a firm's total sales in the ith segment and N is the number of the firm's businesses.

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[1] Although the coefficient of variation is the preferred measure of heterogeneity, the results of regression analyses did not differ substantially when the standard deviation was used.

[2] Blau's index of heterogeneity is calculated as $1 - \Sigma (P_i)^2$, when P_i is the proportion of a group's individuals in the ith category.

TABLE 2
Examples of Values for the Entropy Measure of Diversification

Firms	1980	1983	Amount of Change	Percentage of Change
High diversification				
Westinghouse Electric Corporation	3.38	3.39	.02	0.5
Moderate diversification				
Armco Inc.	1.61	2.27	.66	41.1
Low diversification				
Joseph E. Seagram & Sons	1.05	1.05	.00	0.0

For each firm, line-of-business data at the four-, three-, and two-digit SIC code levels were used to obtain the entropy measure of diversification for 1980 and 1983. We measured changes in diversification strategy by taking the absolute percentage change in a firm's entropy measure from 1980 to 1983.[3] The period chosen was long enough to allow us to capture shifts in corporate diversification posture but brief enough to accurately reflect the actions of the top management team in charge of a company in 1980.

Table 2 shows some examples of the entropy measure within the sample. The measure's value could range from 0 for single business firms to 4 for highly diversified firms. A highly diversified firm like the Westinghouse Electric Corporation had sales in 80 four-digit SIC lines of business, but Joseph E. Seagram & Sons, with low diversification, participated in only 7 four-digit SIC lines. Changes in the entropy measure reflect strategic changes in the composition of a business portfolio.

Prior organizational performance. We measured firm performance as the average return on assets for the three-year period from 1978 to 1980 using data from Standard & Poor's COMPUSTAT. Performance during this time period was assumed to have provided the stimulus for changes in corporate diversification strategy during 1980–83.[4]

Organizational size. Organizational size was measured by taking the logarithm of each firm's 1980 revenues. This measure is the established way to account for differences in firm size when examining organizational outcomes (Montgomery, 1979).

Top management team size. The size of each firm's top management team was measured using the logarithm of the number of individuals in the

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[3] Findings on the relationship between top management team demography and changes in diversification strategy were consistent when diversification was calculated using the entropy measure of diversification at the two-, three-, and four-digit SIC levels. We thus only report findings on the four-digit level.

[4] Average firm performance, rather than performance relative to the industry, was used. A relative performance measure allows for intraindustry comparisons. However, for highly diversified firms with substantial operating revenues from a number of industries, this type of comparison is meaningless. Comparison of a firm's performance to that of a random sample of similarly diversified firms is the most appropriate measure.

top two tiers of the firm's management. We used the logarithmic transformation to capture the anticipated decreasing effect of increases in top management team size on the dependent measure.

Industry structure. Industry structure characteristics were ascertained for the four-digit SIC industry representing each firm's dominant line of business. We measured industry growth, profitability, and concentration using data in the U.S. commerce department's *U.S. Industrial Outlook*, the 1982 *U.S. Census of Manufacturers*, and the Federal Trade Commission's line-of-business data base.

RESULTS

Table 3 presents the means, standard deviations, and correlations among the variables. The size of each firm's top management team ranged from 2 to 8 individuals, with a mean of 4.3. The ages of the top management teams' members varied from 42 to 69 years, and their organizational tenures varied from 5 to 38 years. Regarding educational level, 2 percent of managers had a high school degree, 10 percent had some college, 55 percent held baccalaureate degrees, 22 percent held master's degrees, and 9 percent held doctorates, and 2 percent were missing this data item.

The matrix in Table 3 indicates that there are significant correlations between the trait and heterogeneity variables for organizational tenure (.59) and age (.36). We therefore followed procedures as outlined by Belsely, Kuh, and Welsch (1980) to test for the effects of multicollinearity in the regression analysis. We calculated condition indexes and examined whether a high condition index contributes substantially to the variance of two or more variables. In our analysis, none of the components associated with a high condition index contributed substantially. Additionally, the correlation matrix of the regression coefficients showed no significant correlations between them. Thus, the degree of multicollinearity was not sufficient to warrant concern over the estimates of the regression coefficients.

An exploratory analysis of the influence of educational specialization on changes in diversification strategy was conducted in which two dummy variables were created for the fields of science and engineering. Only science was significantly related to the dependent measure. We entered this dummy variable into the regression equation.[5]

The hypotheses were tested by regressing strategic change, measured by absolute change in the entropy measure of corporate diversification, on the

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[5] The findings for the science specialization led to further analysis to see if this variable's significance could be due instead to an industry effect. We hypothesized that firms with top management teams with predominantly scientific backgrounds might be more frequent in industries generating excess resource capability and thus characterized by high diversification. This relationship was examined by comparing educational specialization with several industry characteristics including marketing, advertising, and R&D expenditures and asset intensity. No statistically significant differences existed across the five specializations on those characteristics.

TABLE 3
Descriptive Statistics and Correlation Matrix[a]

Variables	Means	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Change in strategy	0.19	0.55															
2. Prior organizational performance	0.10	0.07	.14														
3. Organizational size	7.20	0.95	-.02	-.01													
4. Top management team size	4.30	0.95	.09	-.15	.33**												
5. Industry growth	0.68	2.02	-.03	.04	-.19	-.23*											
6. Industry profitability	0.13	0.07	-.16	-.20	.01	.14	-.05										
7. Industry concentration	0.44	0.21	-.01	-.29**	.23*	.30**	-.08	.14									
8. Mean team age	55.55	4.56	-.20	.01	.19	.01	.01	.09	.01								
9. Mean team organizational tenure	19.98	8.48	-.10	.03	.20	-.11	.02	.15	.04	.50***							

TABLE 3 (continued)

Variables	Means	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
10. Mean team executive tenure	9.25	4.33	.04	.03	−.24*	−.42***	.01	−.03	−.29**	.26**	.46***						
11. Mean team educational level	16.50	1.13	.28**	−.16	.04	.17	−.03	−.06	.12	−.14	−.26**	−.26**					
12. Team age heterogeneity	0.11	0.07	−.04	−.10	−.13	.06	.04	.12	.19	−.36**	−.26**	−.13	.21				
13. Team organizational tenure heterogeneity	0.49	0.29	−.13	−.10	.03	.27**	.08	.08	.09	−.19	−.59***	−.42***	.10	.44***			
14. Team executive tenure heterogeneity	0.67	0.37	−.21	−.15	.01	.34**	−.07	.07	.18	−.05	−.10	−.29**	.10	.29**	.38***		
15. Educational specialization heterogeneity	0.61	0.25	−.12	.00	.11	.37***	−.03	.01	.10	.15	.17	.09	−.38***	−.13	−.05	.10	
16. Science specialization			.16	−.12	.17	.01	−.10	−.12	.14	−.02	−.02	−.12	.10	−.09	−.06	−.02	−.14

TABLE 4
Results of Regression Analyses[a]

Variables	Model 1: Control Variables	Model 2: Trait Variables	Model 3: Heterogeneity Variables	Model 4: Full Model	Model 5: Adjusted Full Model
Prior organizational performance	.13	.23*	.12	.24*	.23*
Organizational size	−.07	−.01	−.05	−.02	
Top management team size	.14	.22†	.13	.05	
Industry growth	−.02	.04	−.02	.01	
Industry profitability	−.15	−.07	−.16	−.04	
Industry concentration	.02	.07	.00	.05	
Mean team age		−.16		−.21†	−.18*
Mean team organizational tenure		−.29**		−.25*	−.27*
Mean team executive tenure		.37**		.27*	.27**
Mean team educational level		.27**		.46***	.45***
Science specialization		.14		.18†	.18*
Team age heterogeneity			.14	−.10	
Team organizational tenure heterogeneity			−.11	.07	
Team executive tenure heterogeneity			−.10	−.09	
Educational specialization heterogeneity			.14	.38**	.40***
R^2	.06	.29	.09	.39	.38
Adjusted R^2	.00	.19	.00	.26	.32
F	0.80	2.84**	0.72	3.08***	6.91***

[a] Values shown are the standardized regression coefficients. $n = 87$.
 † $p < .10$
 * $p < .05$
 ** $p < .01$
 *** $p < .001$

control variables and the demographic measures. Table 4 shows results. We tested separate regression equations for five models: (1) control variables only, (2) control and trait variables, (3) control and heterogeneity variables, (4) the full model, and (5) the full model with only significant variables. This approach allows comparison of the relative effects on explained variance of each of the three sets of variables.

In model 1, regressing strategic change on the control variables (prior organizational performance, organizational size, top management team size, industry growth, profitability, and concentration) indicated that the control variables have no significant effect on strategic change.

Regressing strategic change on the control and trait variables in model 2 supported our hypotheses that firms with top management teams character-

ized by more educated members with relatively short organizational tenures will exhibit greater strategic change. Top management team tenure was significant in the direction opposite our prediction: high tenures were related to the dependent measure. The regression analysis indicates that with organizational size, performance, team size, and industry characteristics controlled, demographic traits have a significant effect on the extent of strategic change within a firm. The control and trait sets of variables explained .29 of the variance (adjusted R^2 = .19).

Model 3, in which strategic change is regressed on the control and heterogeneity variables, indicates that age, organizational tenure, top management team tenure, and educational specialization heterogeneity have no significant effect on strategic change.[6] The analysis of the heterogeneity measures does not support the hypotheses that team heterogeneity in age, organizational tenure, and top management team tenure are positively related to changes in corporate strategy.

Model 4, including the control, trait, and heterogeneity variables, provides support for the hypotheses that low age, short organizational tenure, high top team tenure, high educational level, science specialization, and educational specialization heterogeneity are significantly associated with strategic change. Further, firms with high prior performance are also more likely to undergo strategic change. The full model explains .39 of the variance in the dependent measure (adjusted R^2 = .26). Model 5 is the adjusted full model including only the significant variables.

The signs of the coefficients and the statistical significance levels are consistent across the models for all but two variables. Model 4 provides support for a positive and significant relationship between prior organizational performance and strategic change, a result opposite to the direction predicted. In addition, a regression analysis of the full model indicates that educational curriculum heterogeneity has a significant and positive effect on strategic change; this variable's correlation with mean education level (−.38) might help account for the differences across models. The degree of multicollinearity between the trait and heterogeneity variables was not, however, sufficient to warrant concern over the validity of the regression estimate results.

DISCUSSION

The results of this study show a relationship between six of the nine demographic variables studied and changes in corporate strategy. The firms

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[6] We conducted an additional analysis using standard deviation rather than the coefficient of variation to measure heterogeneity. The overall results did not differ; the regression coefficients were slightly larger in the additional analysis because the absolute values for the measure of standard deviation were smaller.

most likely to undergo strategic change had top management teams characterized by relative youth, relatively short organizational tenure, high team tenure, high educational level, academic training in the sciences, and heterogeneity in educational specialization.

This research makes two important contributions to strategic theory. First, it supports the strategic choice view that top management teams have an important influence on the direction of firms through their strategic decisions (Child, 1972). Although previous research has examined links between top team characteristics and strategy type (e.g., Gupta, 1984), our focus on the phenomenon of strategic change was new. Strategic change is an important construct; one of the most basic tenets in the strategy field is that a firm's viability is ensured to the extent that an ongoing alignment between the firm and its environment can be maintained (Andrews, 1971). This adaptation occurs through appropriate and timely changes in the firm's strategy; the responsibility for making such changes ultimately belongs to the firm's top managers (Mintzberg, 1979).

Second, this research provides encouragement for those interested in pursuing the upper echelons perspective of Hambrick and Mason (1984). We found that the demographic characteristics of top management teams have a significant relationship with a strategy-related organizational outcome. Demographic characteristics are an important way to measure individuals' cognitive bases; cognitive bases in turn combine to create certain team abilities and tendencies, resulting in patterns in decision outcomes. Research by Bantel and Jackson (1989) and Murray (1989) has also found support for the link between top team demographic characteristics and strategy- or performance-related outcomes.

The Influence of Demographic Traits

Particularly strong support emerged in this study for the importance of trait effects, or the level of certain demographic characteristics. Firms undergoing strategic change are more often managed by top management teams characterized by lower average age, shorter organizational tenure, higher team tenure, higher educational level, educational specialization heterogeneity, and academic training in the sciences. Case examples can highlight the relationship of several of these characteristics to strategic change. The American Can Company and the Allied Corporation both experienced significant changes in diversification strategy and were managed by top management teams that were relatively young (53 and 50, respectively) with relatively short organizational tenures (6 and 10 years) and above-average levels of education (16 and 17.1 years). Firms that did not undergo significant strategic change were more likely to be managed by older top management teams with longer organizational tenures and lower levels of education. Examples of such firms include the Westinghouse Electric Corporation and the Phillips Petroleum Company. Both firms underwent minimal stra-

tegic change and were managed by teams with respective mean ages of 61 and 59, organizational tenures of 38 and 28 years, and mean educational levels of 16 and 15.6 years.

The findings on organizational tenure are of particular interest. A relationship emerged here between organizational tenure and strategic change. We defined short organizational tenure by taking the mean tenure and subtracting one standard deviation, obtaining 11.5 years, but we expect that this threshold number of years of organizational tenure may vary with the sample studied. The findings suggest that in large, diversified firms, individuals on a management team have been fully assimilated in about 11 years, after which they take on the cognitive perspective of the other members of the team. This finding is consistent with Zenger and Lawrence's (1989) finding that the effect of short tenure on communication within a group diminishes rapidly as tenure increases. Further, these findings are somewhat supported by the work of Katz (1982), who found that beyond a certain level of mean organizational tenure, the performance of a group begins to deteriorate.

A surprising finding was that high, rather than low, top management team tenure is associated with changes in strategy. An additional analysis examining mean top management tenure and strategic change indicated that firms with very short team tenure (less than 5 years, calculated as the mean minus one standard deviation) had the least amount of strategic change. Firms with top management team tenures of more than 13 years (mean plus one standard deviation), however, did not have significantly higher levels of strategic change than the remaining firms in the sample. One possible explanation may be that the greater levels of social integration and more effective patterns of communication characteristic of longer-tenured groups enhance a group's ability to carry out changes in corporate strategy. Over time, top management team members may become adept at getting or sharing input, facilitating productive debates and discussions, gaining or giving commitment to a direction, and moving a group efficiently and rapidly to decision implementation. Beyond some average level of team tenure, however, further increases neither help nor hinder team dynamics. Firms with managers with short top management team tenure, by comparison, have not had enough time to develop the smooth group dynamics that can facilitate strategic change. Similarly, Eisenhardt and Schoonhoven (1990) and Roure and Maidique (1986) found that the sharing of working experience among top team members facilitated growth and success for new ventures.

The combination of short organizational tenure and long top management team tenure leading to changes in strategy may also be the result of another factor: the role of outsiders. We conducted an additional analysis examining differences in top management team and organizational tenure. For firms with teams with relatively short organizational tenures (<11.5 years, $\bar{x} = 7.8$), the mean top management team tenure was 5.7 years. Firms with longer organizational tenures (the remainder of the sample, with a mean of 22 years) had a mean top management team tenure of 10 years.

Therefore, managers on teams with short organizational tenures spent an average 72 percent of their organizational tenures on the top team. Team members in the rest of the sample spent on average less than half (48 percent) of their organizational tenures as members of the top management team. These results indicate that firms with teams with relatively short organizational tenures have brought in outsiders at very high managerial levels. A further analysis was conducted to learn whether executives hired from outside a company pursued increased diversification. The change in diversification strategy was significantly different for the two groups of long and short organizational tenure. The low-tenure group had an average increase in diversification of 46 percent and the long-tenured group had an average increase of 4 percent. It appears that outside executives have a managerial perspective on the firm that facilitated strategic change. Previous work on executive succession supports the role of outsiders as change agents. Helmich and Brown (1972) showed that the appointment of outsiders to a top management team brought in new perspectives and was likely to lead to organizational change.

The Influence of Demographic Diversity

Very little support for the heterogeneity argument emerged. Heterogeneity with respect to educational specialization was related to strategic change, consistent with the theory that diversity in cognitive perspective facilitates adaptation. But heterogeneity on age, organizational tenure, and team tenure were not significantly associated with strategic change.

The lack of major effects for these variables may be attributable to two aspects of this research: our level of analysis and limitation in the range of demographic variables evaluated. With regard to level, it is possible that cognitive and demographic diversity benefit complex decision making (Hoffman & Maier, 1961) less at the top management team level than at lower levels. Prior empirical studies linking group heterogeneity to higher levels of communication and creativity have focused exclusively on lower organizational levels (Katz, 1982; Pelz & Andrew, 1966; Rogers & Shoemaker, 1971; Staw, 1977; Zenger & Lawrence, 1989). In comparison, at the top management level, O'Reilly and Flatt (1989) found a negative relationship between organizational tenure heterogeneity and innovation, and Bantel and Jackson (1989) found no significant relationship between heterogeneity of age or tenure and organizational innovation.

One potential explanation is the difference in interaction frequency for groups at various levels. Interaction frequency among top team members may be low, given extensive line responsibility within the organization for each member; this would be particularly true for *Fortune* 500 firms in which top team managers autonomously run operating units. Interaction dynamics within such teams may play a less significant role in decision outcomes than they play in functional groups at lower organizational levels, such as re-

search groups, whose members need to have ongoing day-to-day interaction to achieve their work goals. We might thus conclude that findings on group decision making at lower levels do not generalize to the top team level.

A second issue is the limited range of demographic variables examined in this study. Group diversity on age and on organizational and team tenure may not adequately capture the underlying constructs of creativity-innovativeness and diversity of information. The heterogeneity argument might have found stronger support with the addition of demographic variables more specifically related to cognitive ability, training, and experience; the one significant heterogeneity measure in this study, educational specialization, is representative.

Another characteristic that might be particularly relevant to strategic change is managers' experience in different industries, particularly with regard to strategy at the corporate level. Managers with varied industrial experience will think more broadly about the diversification possibilities a firm might pursue. Future research to ascertain the additional heterogeneity dimensions most pertinent to strategic decision making at the top level might need to rely on more in-depth analysis, such as case studies and experimental research.

The Role of Control Variables

Organizational size was not found to be related to the dependent variable, which may be a result of the nature of the sample. By definition, a *Fortune* 500 sample represents the largest manufacturing enterprises in the United States, firms with sales in excess of $500 million. As such, these firms are above the threshold size at which inertia and the attendant resistance to change may develop. Size is therefore no longer a differentiating factor in the behavior of these firms.

Firm performance during 1978–80 was found to be positively related to diversification change during 1980–83, contrary to the hypothesis that poor performance would serve as an impetus for strategic change. One explanation for the findings might be the relationship between firm performance and resource availability. A firm's unused or excess productive services, which can be applied to new as well as existing lines of business, create the opportunity to pursue growth into new domains (Nelson & Winter, 1982; Penrose, 1959; Teece, 1982) and thus alter corporate strategy. Alternatively, lack of resources might create a tendency to maintain the status quo. The possibility that the best-performing firms were headed by aggressive, opportunity-seeking managers is another potential explanation.

The lack of significance of top management team size might be at least somewhat attributable to the general lack of significance for the heterogeneity variables. Larger teams are inherently more heterogeneous (see Table 3). As the heterogeneity effects proved less useful in explaining diversification change than the trait effects, the lack of findings for team size is consistent.

Industry structure characteristics were not found to have a significant effect on strategic change. The characteristics of a firm's core industry were not linked to the extent of strategic change the firm pursued. The firms we examined were already quite diverse in strategic posture. As a result, economic characteristics inherent in their core businesses and industries may not be critical for understanding the motivations for further changes in their corporate strategies.

Taking Hambrick and Mason's (1984) upper echelons perspective, previous studies have found evidence of a relationship between top management team demography and such organizational outcomes as performance and innovation. This is the first study linking multiple top management team demographic characteristics to the phenomenon of strategic change. Future researchers should be encouraged by our findings to focus on strategy and strategic change as important outcome variables in relation to top management teams.

REFERENCES

Aldrich, H. 1979. *Organizations and environments.* Englewood Cliffs, NJ: Prentice-Hall.

Aldrich, H., & Pfeffer, J. 1966. Environments of organizations. In R. H. Turnver & J. F. Short, Jr. (Eds.), *Annual review of sociology,* vol. 2: 79–105. Palo Alto, CA: Annual Reviews, Inc.

Allen, T., & Cohen, S. 1969. Information flow in research and development laboratories. *Administrative Science Quarterly,* 14: 12–19.

Allison, P. D. 1978. Measures of inequality. *American Sociological Review,* 43: 865–880.

Alutto, J., & Hrebiniak, L. 1975. *Research on commitment to employing organizations: Preliminary findings on a study of managers graduating from engineering and MBA programs.* Paper presented at the annual meeting of the Academy of Management, New Orleans.

Andrews, K. 1971. *The concept of corporate strategy.* Homewood, IL: Dow Jones-Irwin.

Ansoff, H. I. 1965. *Corporate strategy: An analytic approach to business policy for growth and expansion.* New York: McGraw-Hill.

Back, K. 1951. Influence through social communication. *Journal of Abnormal and Social Psychology,* 46: 9–23.

Bales, R., & Borgatta, E. 1955. Size of group as a factor in interaction profile. In A. Hare, E. Borgatta, & R. Bales (Eds.), *Small groups: Studies in social interaction:* 495–512. New York: Knopf.

Bantel, K., & Jackson, S. 1989. Top management and innovations in banking: Does the composition of the top team make a difference? *Strategic Management Journal,* 10: 107–124.

Bass, P., & Wittink, D. 1978. Firm effects and industry effects in the analysis of market structure and profitability. *Journal of Marketing Research,* 15: 3–10.

Becker, M. 1970. Sociometric location and innovativeness. *American Sociological Review,* 35: 267–304.

Belsley, D. A., Kuh, E., & Welsch, R. E. 1980. *Regression diagnostics: Identifying influential data and sources of collinearity.* New York: Wiley.

Berry, C. H. 1975. *Corporate growth and diversification.* Princeton, NJ: Princeton University Press.

Blau, P. M. 1977. *Inequality and heterogeneity.* New York: Free Press.

Byrne, D. 1961. Interpersonal attraction as a function of affiliation need and attitude similarity. *Human Relations,* 14: 63–70.

Byrne, D., & Wong, T. J. 1962. Racial prejudice, interpersonal attraction, and assumed dissimilarity of attitudes. *Journal of Abnormal and Social Psychology,* 65: 246–253.

Carlson, R., & Karlsson, K. 1970. Age, cohorts, and the generation of generations. *American Sociological Review,* 35: 710–718.

Child, J. 1972. Organization structure, environment, and performance: The role of strategic choice. *Sociology,* 6: 1–22.

Child, J. 1974. Managerial and organizational factors associated with company performance. *Journal of Management Studies,* 11: 13–27.

Cyert, R., & March, J. 1963. *A behavioral theory of the firm.* New Jersey: Prentice-Hall.

Dearborn, D. C., & Simon, H. A. 1958. Selective perception: A note on the department identifications of executives. *Sociometry,* 21: 140–144.

Dollinger, M. 1984. Environmental boundary spanning and information processing effects on organizational performance. *Academy of Management Journal,* 27: 351–368.

Drucker, P. 1974. *Management: Tasks, responsibilities, practices.* New York: Harper & Row.

Dun & Bradstreet. 1980. *Reference book of corporate managements, vols. 1 & 2.* Parsippany, NJ: Dun & Bradstreet.

Dutton, J., & Duncan, R. 1987. The creation of momentum for change through the process of strategic issue diagnosis. *Strategic Management Journal,* 8: 279–296.

Eisenhardt, K., & Schoonhoven, C. 1990. Organizational growth: Linking founding team, strategy, and growth among U.S. semiconductors ventures, 1978–1988. *Administrative Science Quarterly,* 35: 504–529.

Ghiselli, E., & Lodahl, T. 1958. Patterns of managerial traits and group effectiveness. *Journal of Abnormal Social Psychology,* 57: 61–66.

Gort, M. 1962. *Diversification and integration in American industry.* Princeton, NJ: Princeton University Press.

Greiner, L. 1972. Evolution and revolution as organizations grow. *Harvard Business Review,* 50(4): 37–46.

Gupta, A. K. 1984. Contingency linkages between strategy and general manager characteristics: A conceptual examination. *Academy of Management Review,* 9: 339–412.

Gupta, A. K. 1988. Contingency perspectives on strategic leadership: Current knowledge and future research direction. In D. C. Hambrick (Ed.), *The executive effect: Concepts and methods for studying top managers:* 147–178. Greenwich, CT: JAI Press.

Hambrick, D. E., & Mason, P. A. 1984. Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review,* 9: 193–206.

Hambrick, D. E., & Schechter, S. 1983. Turnaround strategies for mature industrial product business units. *Academy of Management Journal,* 26: 231–248.

Hambrick, D. E., & Snow, C. 1977. A contextual model of strategic decision making in organizations. *Academy of Management Proceedings:* 109–112.

Hannan, M., & Freeman, J. 1977. The population ecology of organizations. *American Journal of Sociology,* 82: 929–964.

Hart, P., & Mellons, J. 1970. Management youth and company growth: A correlation? *Management Decision,* 4(1): 50–53.

Helmich, D., & Brown, W. 1972. Successor type and organizational change in the corporate enterprise. *Administrative Science Quarterly,* 17: 371–381.

Hitt, M., & Tyler, B. 1991. Strategic decision models: Integrating different perspectives. *Strategic Management Journal,* 12: 327–352.

Hoffman, R. 1959. Homogeneity of member personality and its effect on group problem-solving. *Journal of Abnormal and Social Psychology,* 58: 27–32.

Hoffman, R., & Maier, N. 1961. Quality and acceptance of problem solutions by members of homogeneous and heterogeneous groups. *Journal of Abnormal and Social Psychology,* 62: 401–407.

Holland, J. 1973. *Making vocational choices: A theory of careers.* Englewood Cliffs, NJ: Prentice-Hall.

Hoskisson, R. E., & Hitt, M. A. 1990. Antecedents and performance outcomes of diversification: A review and critique of theoretical perspectives. *Journal of Management,* 16: 461–509.

Jacquemin, A. P., & Berry, C. H. 1979. Entropy measures of diversification and corporate growth. *Journal of Industrial Economics,* 27: 359–369.

James, D. R., & Soref, M. 1981. Profit constraints on managerial autonomy: Managerial theory and the unmaking of the corporation president. *American Sociological Review,* 46: 1–18.

Janis, I. 1972. *Victims of groupthink.* Boston: Houghton-Mifflin.

Kahalas, H., & Groves, D. 1979. An exploration of graduate business students values. *Journal of Industrial Psychology,* 6: 18–24.

Kanter, R. 1977. *Men and women of the corporation.* New York: Basic Books.

Katz, R. 1982. The effects of group longevity on project communication and performance. *Administrative Science Quarterly,* 27: 81–104.

Kiesler, C. A., & Kiesler, S. B. 1969. *Conformity.* Reading, MA: Addison-Wesley.

Kiesler, S. B., & Sproull, L. 1982. Managerial response to changing environments: Perspectives on problem sensing from social cognition. *Administrative Science Quarterly,* 27: 548–570.

Kimberly, J., & Evanisko, M. 1981. Organizational innovation: The influence of the individual, organizational, and contextual factors on hospital adoption of technological and administrative innovations. *Academy of Management Journal,* 24: 689–713.

Lawrence, P., & Lorsch, J. 1967. *Organization and its environment.* Boston: Harvard University Press.

Lecraw, D. J. 1984. Diversification strategy and performance. *Journal of Industrial Economics,* 38: 179–199.

Lott, A. J., & Lott, B. E. 1961. Group cohesiveness, communication level, and conformity. *Journal of Abnormal and Social Psychology,* 62: 408–412.

Lott, B. E., & Lott, A. J. 1965. Group cohesiveness and interpersonal attraction: A review of relationships with antecedent and consequent variables. *Psychological Bulletin,* 4: 259–309.

McCain, B., O'Reilly, C., & Pfeffer, J. 1983. The effects of departmental demography on turnover. *Administrative Science Quarterly,* 26: 626–641.

March, J. G., & Simon, H. 1958. *Organizations.* New York: Wiley.

Marquis Who's Who, Inc. 1981. *Who's Who in Finance and Industry* (22nd ed.). Chicago: Marquis Who's Who, Inc.

Meyer, M. 1972. Size and the structure of organizations: A causal analysis. *American Sociological Review*, 37: 434–440.

Michel, J., & Hambrick, D. 1992. Diversification posture and top management team characteristics. *Academy of Management Journal*, 35: 9–37.

Miller, D. 1991. Stale in the saddle: CEO tenure and the match between organization and environment. *Management Science*, 37: 34–52.

Mintzberg, H. 1979. *The structuring of organizations.* Englewood Cliffs, NJ: Prentice-Hall.

Montgomery, C. A. 1979. *Diversification, market structure, and firm performance.* Ann Arbor, MI: University Microfilms.

Murray, A. 1989. Top management group heterogeneity and firm performance. *Strategic Management Journal*, 10: 125–141.

Nelson, R. R., & Winter, S. G. 1982. *An evolutionary theory of economic change.* Cambridge, MA: Harvard University Press.

Norburn, D., & Birley, S. 1988. The top management team and corporate performance. *Strategic Management Journal*, 9: 225–237.

Normann, R. 1977. *Management for growth.* New York: Wiley.

O'Reilly, C. A., III, Caldwell, C., & Barnett, D. 1989. Work group demography, social integration, and turnover. *Administrative Science Quarterly*, 34: 21–37.

O'Reilly, C. A., III, & Flatt, S. 1989. *Executive team demography, organizational innovation and firm performance.* Working paper, University of California, Berkeley.

Palepu, K. 1985. Diversification strategy, profit performance, and the entropy measure. *Strategic Management Journal*, 6: 239–255.

Pelz, D., & Andrews, F. 1966. *Scientists in organizations.* New York: Wiley.

Penrose, E. 1959. *The theory of the growth of the firm.* Oxford: Basil Blackwell.

Pfeffer, J. 1981. *Power in organizations.* Pitman.

Pfeffer, J. 1983. Organizational demography. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior,* vol. 5: 299–357. Greenwich, CT: JAI Press.

Porter, M. 1987. From competitive advantage to corporate strategy. *Harvard Business Review*, 65(3): 43–59.

Quinn, R. E., & Cameron, K. 1983. Organizational life cycles and shifting criteria of effectiveness: Some preliminary evidence. *Management Science*, 29: 33–50.

Reed, R. L. 1978. Organizational change in the American foreign service, 1925–1965: The utility of cohort analysis. *American Sociological Review*, 43: 404–421.

Reed, R., & Luffman, G. 1986. Diversification: The growing confusion. *Strategic Management Journal*, 7: 29–36.

Rhodes, S. 1983. Age-related differences in work attitudes and behavior: A review and conceptual analysis. *Psychological Bulletin*, 93: 328–367.

Rogers, E., & Shoemaker, F. 1971. *Communication of innovations.* New York: Free Press.

Rokeach, M. 1960. *The open and closed mind.* New York: Basic Books.

Roure, J., & Maidique, M. 1986. Linking prefunding factors and high technology venture success: An exploratory study. *Journal of Business Venturing*, 1: 295–306.

Rumelt, R. P. 1974. *Strategy, structure, and economic performance.* Cambridge, MA: Harvard University Press.

Ryder, N. B. 1965. The cohort as a concept in the study of social change. *American Sociological Review,* 30: 843–861.

Schendel, D., Patten, R., & Riggs, J. 1975. *Corporate turnaround strategies.* Working paper no. 486, Krannert Graduate School of Industrial Administration, Purdue University, West Lafayette, IN.

Schmidt, W., & Posner, B. 1983. *Managerial values in perspective.* New York: American Management Association.

Schroder, H. M., Driver, M. J., & Steufert, S. 1967. *Human information processing.* New York: Holt Rinehart & Winston.

Shaw, M. E. 1976. *Group dynamics: The psychology of small group behavior.* New York: McGraw-Hill.

Shaw, M. E., & Shaw, L. M. 1962. Some effects of sociometric grouping upon learning in a second grade classroom. *Journal of Social Psychology,* 57: 453–458.

Sorenson, T. 1968. *Decision making in the White House.* New York: Columbia University Press.

Staw, B. 1977. Motivation in organizations: Toward synthesis and redirection. In B. M. Staw & G. R. Salancik (Eds.), *New directions in organizational behavior:* 55–95. Chicago: St. Clair Press.

Staw, B., & Ross, J. 1980. Commitment in an experimenting society: A study of the attribution of leadership from administrative scenarios. *Journal of Applied Psychology,* 65: 249–260.

Stevens, J., Beyer, J., & Trice, H. 1978. Assessing personal, rate, and organizational predictors of managerial commitment. *Academy of Management Journal,* 21: 380–396.

Stinchcombe, A. L., McDill, M. S., & Walker, D. R. 1968. Demography of organizations. *American Journal of Sociology,* 74: 221–229.

Taylor, R. 1975. Age and experience as determinants of managerial information processing and decision-making performance. *Academy of Management Journal,* 18: 74–81.

Teece, D. J. 1982. Towards an economic theory of the multiproduct firm. *Journal of Economic Behavior and Organization,* 3: 39–63.

Triandis, H., Hall, E., & Ewen, R. 1965. Member heterogeneity and dyadic creativity. *Human Relations,* 18: 33–55.

Tushman, M., & Romanelli, E. 1985. Organizational evolution: A metamorphosis model of convergence and reorientation. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior,* vol. 7: 171–222. Greenwich, CT: JAI Press.

Vroom, V., & Pahl, B. 1971. Relationship between age and risk-taking among managers. *Journal of Applied Psychology,* 55: 399–405.

Wagner, W. G., Pfeffer, J., & O'Reilly, C. A., III. 1984. Organizational demography and turnover in top-management groups. *Administrative Science Quarterly,* 29: 74–92.

Walsh, J. 1988. Selectivity and selective perception: An investigation of managers' belief structures and information processing. *Academy of Management Journal,* 31: 873–896.

Wanous, J., & Youtz, M. 1986. Solution diversity and the quality of group decisions. *Academy of Management Journal,* 29: 149–158.

Weick, K. 1969. *The social psychology of organizing.* Reading, MA: Addison-Wesley.

Whitney, J., & Smith, R. 1983. Effects of group cohesiveness on attitude polarization and the acquisition of knowledge in a strategic planning context. *Journal of Marketing Research*, 20: 167–176.

Zander, A. 1977. *Groups at work.* San Francisco: Jossey-Bass.

Zenger, T. R., & Lawrence, B. S. 1989. Organizational demography: The differential effects of age and tenure distributions on technical communication. *Academy of Management Journal*, 32: 353–376.

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ROLE OF INDIVIDUAL ATTACHMENTS IN THE DISSOLUTION OF INTERORGANIZATIONAL RELATIONSHIPS

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In this study, we propose that changes affecting the resource fit between organizations exchanging resources provide an impetus for the dissolution of their relationships, whereas the individual and structural attachments that develop between exchange partners over time counter those pressures for change. The empirical analysis examined the severance of auditor-client relationships using a case-control design. Change in clients' resource needs increased the likelihood of their switching auditors, but attachment of individuals primarily responsible for the exchange relationship decreased the likelihood of switching. Moreover, those attachments attenuated the effect of changes in clients' resource needs on the likelihood of switching auditors. The study suggests that ties between boundary spanners play a major role in the maintenance of interorganizational relationships.

Exchange relationships between organizations are becoming a salient topic in research concerning both business strategy (Harrigan, 1987; Hladik, 1985) and organizational theory (Powell, 1990). An exchange relationship is a formal or informal set of arrangements between organizations involving the transfer of resources or services. In exploring such relationships, researchers have focused on determinants of their formation (Aiken & Hage, 1968; Borys & Jemison, 1989; Van de Ven, 1976) and, to a greater extent, on issues of power and dependency in existing relationships (Aldrich, 1979; Blau, 1964; Emerson, 1962, 1972, 1976; Pfeffer & Salancik, 1978; Pisano, 1989; Van de Ven & Walker, 1984). The research reported here explored the dissolution of dyadic interorganizational exchange relationships, focusing on their dynamic features. In particular, we examined the effects of the development of interorganizational attachments and changes in resource fit between exchange partners on the likelihood of dissolution.

One approach to understanding the dissolution of interorganizational relationships is to view it as the inverse of their formation. This approach suggests that an organization would end an exchange relationship when the organization with which it was contracting could no longer provide the desired resources or when another organization less threatening to the autonomy of the first organization could satisfy those needs (Aiken & Hage, 1968; Van de Ven, 1976). Such a view of the dissolution process ignores the critical concept of attachment. The conditions and processes associated with the formation of exchange relationships are not the same as those associated with their persistence or severance. The history of interorganizational relationships influences the conditions and processes leading to their dissolution. Social exchange theorists have addressed this issue in their analyses of development of attachment, or commitment, between exchange partners (Blau, 1964; Cook, 1977; Cook & Emerson, 1978; Emerson, 1962).

Attachment is the binding of one party to another (Salancik, 1977; Staw, 1982). It constitutes a counterforce to change rather than a pressure for change. Attachment between exchange partners accrues through experience in the exchange relationship and as a result of investments the exchange partners make in the relationship over time. The development of attachment may lead to maintaining an existing relationship even though it provides fewer of the needed resources than it used to or even though a more attractive alternative is available. In this manner, attachment may attenuate the effects of changes affecting resource fit on the likelihood of a relationship dissolving.

Our research addressed two central aspects of the dynamics of interorganizational relationships. First, we considered the nature of the attachment between organizations. Although Levinthal and Fichman (1988) provided evidence of persistence in exchange relationships and suggested that characteristics of a task setting influence these inertial forces, they did not examine the locus of the attachment between exchange partners. In this research, we examined the extent to which the attachment that emerges with time between exchange partners is embedded in structural ties between the two organizations and in individual relationships developed by boundary spanners. Second, we considered not only the direct effect of attachment, but also how it moderates the impact of changes affecting resource fit between two parties.

THEORETICAL PERSPECTIVES

Resource Fit

As suggested, one approach to understanding the dissolution of interorganizational relationships is to assume that the reasons for the severing of exchange relationships are the inverse of the reasons for their formation. Therefore, we considered the conditions that affect the selection of exchange partners and, by implication, the effect of changes in those conditions on the dissolution process. Research on the formation of dyadic relationships sug-

gests several determinants of interorganizational arrangements: social ties, network membership, and resource procurement (Aiken & Hage, 1968; Cook, 1977; Galaskiewicz, 1985; Granovetter, 1973, 1985; Van de Ven, 1976). The dominant perspective is that organizations enter relationships with other organizations to procure needed resources (Galaskiewicz, 1985; Van de Ven, 1976). In this view, the critical elements are one organization's resource needs, another's resource provisions, and the set of potential alternatives (Aiken & Hage, 1968; Van de Ven, 1976). This perspective, however, acknowledges the role of social ties and a broad network of relationships in providing knowledge about potential exchange partners. Boundary spanners, that is, those organizational members whose role requires both intra- and interorganizational relationships, have knowledge of feasible partners that determines the "opportunity set" from which a specific partner is chosen (Van de Ven, 1976). We did not examine these broader network relationships and, hence, the effect of "weak ties" (Granovetter, 1973), but we did consider the effect of direct ties between exchange partners in the context of our treatment of attachment.

An organization tries to select the partner that is best able to provide needed resources, given the set of alternatives. This criterion concerns the fit between one organization's resource needs and another's resource provision, relative to an opportunity set. If, however, several potential exchange partners are equally compatible, issues of autonomy affect the selection of a partner (Aiken & Hage, 1968; Cook, 1977; Van de Ven, 1976), and an organization will select the alternative that will have the least impact on its autonomy. As Cook argued, "Organizations seek to form that type of interorganizational exchange relationship which involves the least cost to the organization in loss of autonomy and power" (1977: 74). For example, in the context of a buyer-supplier relationship, a customer's power vis-à-vis a supplier may be related to the share of the supplier's total sales the customer represents. Therefore, of suppliers that can meet the buyer's needs, the buyer may wish to choose the smallest firm.

These two concerns, satisfaction of resource needs and desire for autonomy, have implications not only for the selection process but also for the conditions leading to the dissolution of a relationship. After an agreement is established, either a reduction in the ability of exchange partners to satisfy resource requirements or a diminution of autonomy will affect the likelihood of the termination of the relationship. A reduction in the ability of exchange partners to satisfy resource requirements may result from increases in one organization's resource requirements, decreases in its exchange partner's provisions, or increases in the opportunity set. In turn, a deterioration of an exchange partner's suitability enhances the chance of an organization's finding another partner that provides a better fit and, as a result, increases the probability of dissolution of the relationship. Other changes, however, may increase an exchange partner's ability to provide resources and may therefore reduce the other exchange partner's autonomy. In particular, decreases in an organization's resource requirements, increases in the ex-

change partner's provisions, and decreases in the opportunity set would tend to reduce the focal organization's autonomy. For example, decreases in its resource needs, all else being equal, reduce an organization's ability to exercise control over an exchange partner. This potential reduction of the first organization's autonomy then raises the likelihood of dissolution because another suitable exchange partner that presents less of a threat to the organization's discretion may exist in the opportunity set.

This analysis also applies to changes that occur between successive negotiations of an interorganizational agreement. If the agreement between exchange partners is renegotiated periodically, the opportunity exists at each renegotiation to continue the relationship under the same or revised terms or to terminate it. If the parties reach an agreement, the renewed relationship presumably constitutes a good fit between one party's resource requirements and the other's resource provisions, relative to the alternatives available at the time of the renegotiation. Subsequently, however, change in these conditions affects the probability that the relationship will be reestablished at the time of the next negotiation. For either party in a dyadic relationship, changes in the other's suitability raise the likelihood of severing the exchange arrangement as a consequence of either a failure to satisfy resource requirements or a reduction in autonomy.

> *Hypothesis 1: The greater the change over the period between agreements in a focal organization's resource requirements, its exchange partner's resource provisions, or the focal organization's set of alternative exchange partners, the greater the likelihood of the dissolution of the relationship.*

The preceding discussion assumes that the effect of changes in resource fit on the likelihood of severing a relationship is independent of the history or duration of the relationship. This assumption ignores the dynamics of exchange relationships (Levinthal & Fichman, 1988; Van de Ven, 1976; Van de Ven & Walker, 1984). Consider, for example, a situation in which a supplier becomes less capable than an available alternative of satisfying a customer's resource requirements. The argument regarding resource fit suggests that in this situation the customer will switch suppliers, regardless of whether the customer-supplier relationship is new or long-standing. This prediction discounts the possibility that exchange partners develop attachments over time and that those attachments will attenuate the effects of a relatively poor fit.

Attachment

Several theorists have addressed the concept of attachment, or commitment, between exchange partners (Blau, 1964; Cook, 1977; Cook & Emerson, 1978; Emerson, 1962; Hirschman, 1970; Macaulay, 1963; Salancik, 1977; Williamson, 1975, 1979, 1981; Williamson & Ouchi, 1981). Some researchers have equated attachment with transactional perseverance, or immobility.

For example, Cook and Emerson defined interparty commitment in terms of immobility: "An actor is said to be committed to another actor in the network to the extent that choice of current exchange partner, from among alternative partners, can be predicted from previous partnerships" (1978: 728). Immobility, however, can result either from the lack of pressures for change or from the blocking of such pressures. Other researchers have maintained that attachment affects immobility through the latter process (Blau, 1964; Cook, 1977; Salancik, 1977). Taking that approach, we defined attachment as an inertial or binding force between exchange partners that can lead to the maintenance of an existing relationship to the exclusion of alternatives.

Several authors have suggested that establishing and maintaining exchange relationships requires investments that in turn lead to attachment between exchange partners (Blau, 1964; Cook, 1977; Williamson, 1975). For example, Blau argued that "many exchange transactions depend upon, or are facilitated by, the investments made in them by at least one party—the inservice training without which a man could not do his specialized job, or the railroad spur to transport goods from manufacturer to purchaser" (1964: 160). Williamson (1975, 1979, 1981) stressed the difference between investments that are specialized, and therefore cannot be sold outside a given relationship without a loss in value, and investments that are unspecialized. He argued that although the establishment and maintenance of exchange relationships may necessitate both types of investments, only the specialized ones create interparty attachment. Because unspecialized investments retain their value in another context, they do not bind exchange partners. Idiosyncratic investments, however, lose value upon transfer to another exchange partner. Because of the costs associated with marketing or acquiring such investments, exchange partners become locked into existing relationships.

Research on attachment has also distinguished between the roles of personal relationships and ties between exchange partners at an organizational level. Macaulay (1963), for example, emphasized the role of personal relationships in the coordination of interorganizational transactions, suggesting that the development of such relationships attenuates the need for exchange partners to resort to contractual practices and legal sanctions. Similarly, Adams (1976) argued that interorganizational exchanges lead to the development of personal relationships between the boundary spanners of the interacting organizations and that those relationships mediate the management of transactions. More generally, Granovetter suggested that relationships are socially embedded, stressing "the role of concrete personal relations and structures (or 'networks') of such relationships in generating trust and discouraging malfeasance" (1985: 490). Van de Ven (1976), on the other hand, stressed the development of structural mechanisms for coordinating exchange relationships, arguing that structural solutions to recurring coordination issues are often more efficient than interpersonal mechanisms.

Thus, attachments in an exchange relationship may emerge as the result

of individual- or organization-level ties. Sources of individual attachment include personal skills, knowledge, and interpersonal relationships; specific organization members constitute the repository of such assets. Sources of organizational attachment include the formalization and standardization of exchange arrangements, such as the establishment of policies and procedures for managing interorganizational transactions. The collectivity, rather than specific individuals, is the repository of these assets.

Attachment reflects the prior history of an exchange relationship. More specifically, individual attachment reflects the prior history of learning and socialization by individuals during their involvement in exchange activities, whereas structural attachment reflects the history of organizational investments made since the formation of the interorganizational relationship. Thus, structural attachment increases as the duration of the relationship increases. Individual attachments, however, are not necessarily related to the duration of an interorganizational relationship. Individual attachments accrue over the period of time the particular organizational representatives are involved in exchange activities. For this reason, turnover in boundary-spanning positions will attenuate individual attachments. An individual who has engaged in particular exchange activities for a long time is likely to have developed a greater degree of attachment than an individual who has engaged in exchange activities for a short time. Thus, structural attachment is related to the duration of an interorganizational relationship, whereas individual attachment is related to the tenure of individuals in boundary-spanning roles in the exchange relationship.

> Hypothesis 2: The greater the individual or structural at-
> tachment between exchange partners, the lower the like-
> lihood of the dissolution of their relationship.

Attachment has several consequences for exchange relationships. Blau (1964), Cook (1977), Cook and Emerson (1978), and Hirschman (1970) have suggested that interparty attachment leads to maintaining an exchange relationship that is providing fewer of the needed resources than it originally did, curtailing the exploration of available alternatives, and more generally, enhancing immobility. For instance, Cook argued that "attachment or commitment serves to prolong the exchange and tends to limit the mobility of the exchange partners by preventing the exploration of alternatives in order to take advantage of opportunities which would increase their reward levels and improve their positions in an exchange network" (1977: 68).

This discussion suggests that the development of individual or structural attachment counters the pressures for dissolution stemming from changes in resource fit. In particular, attachment moderates the effect of changes in resource requirements, provisions, and the set of alternatives on the likelihood of the dissolution of a relationship. Figure 1 depicts the hypothesized form of this moderating effect. First, as Hypothesis 2 states, attachment exerts a main effect on the likelihood of dissolution. At any level of change in resource fit, attachment reduces the likelihood of severing a

relationship. Second, the effect of change in resource fit on the likelihood of dissolution decreases as attachment increases:

> *Hypothesis 3: The greater the individual or structural at-*
> *tachment between exchange partners, the lower the effect*
> *of change in resource requirements, resource provisions,*
> *and the set of alternative exchange partners on the like-*
> *lihood of the dissolution of their relationship.*

In summary, the proposed framework posits that changes in resource fit provide an impetus for dissolution, whereas the attachment that develops between exchange partners counters those pressures for change. The concept of attachment emphasizes the role of history in exchange relationships, suggesting that past exchanges affect the likelihood of future exchanges.

METHODS

Case-Control Design

This research employed a case-control design, investigating subjects with the condition of interest (the cases) and subjects without this condition (the controls) and then comparing them with respect to the hypothesized explanatory variables. In a sense, such an approach proceeds from effect to cause (Anderson, Auquier, Hauck, Oakes, Vandaele, & Weisberg, 1980; Schlesselman, 1982). The particular empirical context that we examined was the dynamics of the relationship between audit firms and their clients. Thus, we found companies that had and companies that had not switched auditors, collected data on antecedent and concurrent explanatory variables, and compared switchers with nonswitchers. Although this

FIGURE 1
Hypothesized Effects
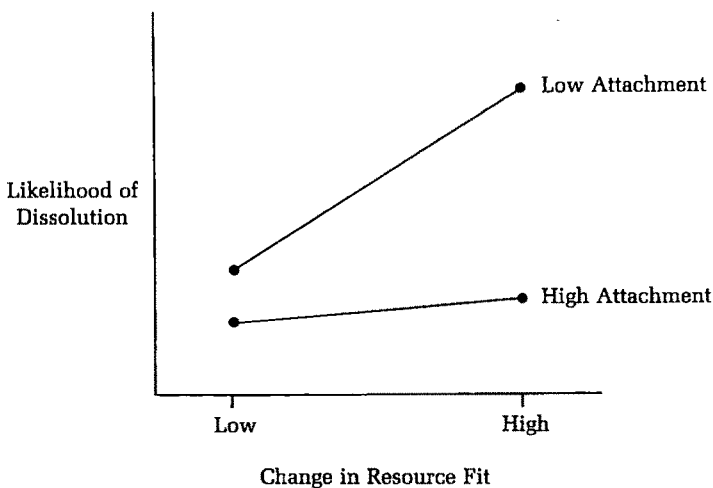
method has been used in epidemiological studies of lung cancer, sudden infant death, toxic shock syndrome, and other infrequent conditions (Schlesselman, 1982), it has received relatively little attention in organizational research (for exceptions, see Hambrick and D'Aveni, 1988, and Kosnik, 1987).

The case-control approach has several strengths and weaknesses. Its critical strength is allowing a more efficient examination of a low-probability phenomenon than a cohort design would allow.[1] Estimates indicate that the annual rate of auditor switching among publicly held U.S. firms is less than 4 percent (Chow & Rice, 1982; Johnson & Lys, 1985; Levinthal & Fichman, 1988). For this reason, the case-control approach is well suited to a study of the dissolution of auditor-client relationships.

A critical concern with case-control designs is their retrospective sampling design. Unlike a cohort design, a case-control approach requires selection of subjects based on a criterion variable. As a consequence, the proportion of cases to controls in a retrospective sample may not represent the actual proportion of cases to controls in the target population. When case-control data are studied with binary logistic regression analysis, this lack of representativeness biases estimates of the constant term in proportion to the fractions of cases and control (Schlesselman, 1982). However, because we sampled control cases randomly and could assume that the controls were at risk of dissolving their attachments, the coefficient estimates of the predictor variables are not biased (Palepu, 1986; Schlesselman, 1982). Estimates of the coefficients of the explanatory variables would agree with such estimates based on data from a cohort study (Anderson et al., 1980; Schlesselman, 1982).

A case-control design also raises the risk that unspecified variables will be omitted or are confounded with the variables of interest. However, all nonrandomized designs, including the prospective and retrospective cohort designs for which the case-control approach is an efficient alternative, share this weakness. In the context of the analysis of auditor switching, a failure to control for a client firm's size might bias estimates of the effect of changes affecting resource fit on auditor switching. For instance, small firms are more likely to switch auditors than large firms (Levinthal & Fichman, 1988; Mangold, 1987; Schwartz & Menon, 1985). If small firms are also more likely to experience sizable changes in factors affecting resource fit, failure to control for firm size would induce different distributions of such changes for cases and controls, irrespective of the effect of such changes on auditor switching. The undetected confound could result in a spurious relationship between changes affecting resource fit and auditor switching. Steps to con-

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[1] A cohort design proceeds from cause to effect (Schlesselman, 1982). Thus, in a cohort study a random or stratified sample of subjects is selected for study. The subjects are classified according to their exposure to the hypothesized explanatory factors. The outcome of interest is then measured and the exposed and unexposed subjects compared.

trol for potential confounds taken here included the use of control variables and a matching procedure.

Auditor-Client Relationships

Relationships between companies and their independent auditors are a useful setting for examining the dissolution process for two reasons (Levinthal & Fichman, 1988). First, publicly held firms are required by law to provide their stockholders with external audits. Clients can neither replace external audit services with other services, such as internal audits, nor exit the external audit market itself. When a given auditor-client relationship is terminated, the client must employ another auditor. This limiting of clients' alternatives to those in the external audit market provides a manageable limit to the set of alternatives that need to be included in the research design. Second, there are few legal or formal impediments to switching auditors. Investments in physical capital are not sizable enough to lock exchange partners into a given relationship. However, auditor-client relationships may entail relation-specific investments in human capital (Danos & Eichenseher, 1982).

Since the enactment of the Securities Exchange Act of 1934, an independent audit of annual financial statements has been a requirement for publicly held corporations (Carmichael & Willingham, 1985). An external auditor independently assesses a firm's financial statements. An audit "opinion" states whether the financial statements fairly present the company's position, conform to generally accepted accounting principles, and consistently apply those principles. An "unqualified" opinion attests to the soundness of the financial statements. A "qualified" opinion, however, indicates the presence of material uncertainties or inconsistencies in the application of generally accepted accounting principles (Bernstein, 1974). A disclaimer, or adverse opinion, results from uncertainties that cannot be assessed or from the presence of deviations from generally accepted accounting principles (Bernstein, 1974).

Research in accounting has revealed a number of events associated with the dissolution of auditor-client relationships. Some of these would appear to be related to the resource needs of clients. In particular, the need for an initial public offering of stock (Carpenter & Strawser, 1971) or, more generally, for new financing (Burton & Roberts, 1967; Carpenter & Strawser, 1971; Macchiaverna, 1981), as well as changes in a client's size (Levinthal & Fichman, 1988; Mangold, 1987; Schwartz & Menon, 1985), a need for additional services (Burton & Roberts, 1967; Carpenter & Strawser, 1971; Macchiaverna, 1981), and dissatisfaction with audit services (Bedingfield & Loeb, 1974; Burton & Roberts, 1967; Carpenter & Strawser, 1971) have all been shown to be associated with a heightened risk of dissolution. Another factor found to increase the likelihood of dissolution is dissatisfaction with an auditor's fees (Bedingfield & Loeb, 1974; Carpenter & Strawser, 1971; Eichenseher &

Shields, 1983; Macchiaverna, 1981). Finally, changes in a client's management, which in our view would reduce the degree of attachment between the auditor and client, results in an increased risk of dissolution (Burton & Roberts, 1967; Chow & Rice, 1982; Schwartz & Menon, 1985).

The source of the companies studied was the primary, secondary, and tertiary files of the 1983 COMPUSTAT financial data base (Standard & Poor's Corporation, 1984). This data base contains information on 2,388 publicly held companies, including all the companies traded on the New York and American stock exchanges and many traded over-the-counter. Data necessary for measuring clients' resource requirements were not available for banking, insurance, or public utility companies. Therefore, we excluded those firms from the sampling frame. This criterion excluded firms from 5 of the 63 two-digit Standard Industrial Code (SIC) industries represented in the COMPUSTAT files; the excluded firms constituted approximately 500 of the 2,388 companies.

In addition, data on the industry-specific markets for audit services were necessary to develop measures of auditors' resource provisions and clients' set of alternatives. Certain two-digit SIC industries, however, were poorly represented in the files; for example, there were only 2 firms in the educational services industry. For this reason, we limited the frame to firms in industries that contained a minimum of 20 companies. This criterion excluded firms from 26 of the 63 industries represented; the excluded firms constituted approximately 300 of the 2,388 companies. The resulting data frame from which cases and controls were drawn consisted of 1,604 publicly held companies in 32 two-digit SIC industries.

A case was defined as a company that had dissolved its relationship with its independent auditor and had therefore employed a new audit firm. A control was defined as a company that had retained its auditor. The dissolution of an auditor-client relationship was defined as a change in the identity of the client's auditor, except when this event was associated with any of the following circumstances: (1) the client's incumbent auditor merged with or was acquired by another audit firm and the relationship continued with this new entity, (2) the client's incumbent auditor ceased practice, and a successor to this practice could not be identified, or (3) the event followed a merger of the client firm with another company, with the latter being the surviving company. The timing of a dissolution event was determined by when the responsibility for evaluating financial statements was transferred from the former to the new auditor. We identified cases using corporate annual reports, 10-K statements, Moody's *Industrial Manual*, Moody's *Transportation Manual*, Moody's *OTC Industrial Manual*, Standard and Poor's *Register of Corporations, Directors and Executives*, and *Who Audits America* (Harris, 1976–1984). Companies that made one or more switches between 1978 and 1983 that met the criteria were eligible cases, with the remaining companies being eligible controls. We studied all qualified cases from this time period to obtain a sufficient number of switchers. For eight firms that changed auditors more than once, we ran-

domly chose one of the dissolutions for study.[2] This process resulted in 170 cases.

A set of 170 control firms was selected by frequency matching controls to cases according to (1) the year a switch occurred and (2) company size, defined as small, medium, or large, such that the distribution of years and size was the same for the cases and the controls. This procedure involved stratifying all the eligible controls on the basis of year and size and then randomly selecting controls from the strata in proportion to the number of cases in each subgroup. Switchers and nonswitchers were frequency matched according to year and size to mitigate the potentially confounding effects of these variables. We chose year as a matching variable to control for the potential "nonstationarity" of the dissolution process over time. For example, changes in the professional code of ethics regulating auditor behavior could affect the switching process in a given year. If such changes were related to any of the explanatory variables, they could bias estimates of the effects of those variables on the likelihood of dissolution. We chose company size as a matching variable because it also represented a potential confound, since small clients are more likely to switch auditors than large clients (Levinthal & Fichman, 1988; Mangold, 1987; Schwartz & Menon, 1985). If size were also related to any of the explanatory variables, it could bias estimates of the effects of those variables on the likelihood of dissolution.

Each year's size groupings were based on the assets of the 1,604 companies in the data frame. We measured size as the natural logarithm of total assets using the logarithmic transformation to normalize the distribution of assets. For each year from 1978 through 1983, we determined the size groupings by performing three-mean cluster analyses on the sizes of all the companies (Hartigan, 1975). All cases were stratified according to the year of the dissolution event and the size of the company. Eligible controls were randomly assigned to one of the year groupings and stratified by size. Controls were then randomly selected in equal number to the number of cases in each year-by-size stratum. The selection procedure resulted in a study group of 170 switchers and 170 nonswitchers.

Measures

Measures were developed for the three proposed components of resource fit—a client's resource requirements, an auditor's resource provisions, and the client's set of alternatives—and the two types of attachments: individual and structural. Corporate annual reports, 10-K statements, proxy statements, COMPUSTAT files, Moody's *Manuals*, and Standard and Poor's *Register of Corporations, Directors and Executives* provided the data for these measures.

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[2] Including more than one switch for a single firm would have violated the assumption that the explanatory variables were independently distributed, which is necessary to justify the statistical analysis. By the same logic, a firm could only act as a control for a single year.

Our measures did not allow us to directly assess resource fit. However, they did allow us to measure changes in the components of resource fit: the changing needs of the clients and the changing resources of the auditors. If an audit firm–client relationship is intact at a given time, it is likely to continue in the following year in the absence of significant changes in the components of resource fit. However, substantial changes in the components of resource fit from one year to the next might suggest that the quality of the fit has deteriorated.

This argument does not imply that relationships that continue represent good fits between auditors and clients in some absolute sense. Indeed, a central implication of our discussion of the role of attachment is that even poor matches between auditor and client may continue as a result of a high level of attachment between the two parties. However, the continuation of a relationship does suggest some minimal level of fitness and that, absent some further deterioration in the level of resource fit, the match will tend to continue.

The proposed framework for examining the dissolution process incorporates an assumption that either party in an exchange arrangement can sever the relationship. A comprehensive test of this framework would examine the effect of both parties' resources and attachments on the likelihood of dissolution. With respect to the individual-level sources of attachment, however, the present study was restricted to the clients' side of the relationship. Data on auditing firms' personnel are not publicly available. However, since an auditing firm has an incentive to manage change in the responsibilities of auditing personnel so as to minimize deterioration in degrees of attachment, limiting the focus to the client's personnel should have captured the major sources of variability with respect to the effect of individual attachments on dissolution.

Resource Requirements

The literature on auditor-client relationships suggested measures of clients' resource requirements. The resource that a company needs from an audit firm is external verification. Simunic's (1980, 1984) work indicated that the verification task is more demanding the more complex the audit situation. Measures of difficult-to-audit assets he developed include the ratio of foreign to total assets, the ratio of receivables to total assets, and the ratio of inventories to total assets.

Those three measures were used to indicate changes in resource requirements. Clients' contracts with auditors are negotiated annually. Our theory suggests that either increases or decreases in resource requirements can affect the likelihood of switching. Therefore, the relevant measure of change is the absolute value of the difference in the ratios of receivables, inventories, and foreign assets to total assets between t, the year of the event, and the preceding year ($t - 1$). We also conducted exploratory analysis of changes over a two-year period. For each of these measures, we constructed two variables: the absolute value of the difference between the ratios at times t

and $t - 1$,[3] and a dummy variable representing the direction of a change, coded 1 if an increase in the ratio occurred between $t - 1$ and t. Since the absolute value of the change in these ratios is a continuous measure, there were no instances of zero change, and the dummy variable for the direction of change distinguished all observed cases. Annual reports, 10-K statements, and COMPUSTAT provided the data for these measures.

We used two additional variables to account for whether a client had foreign assets and whether those assets were material and constituted 10 percent or more of the firm's total assets. Material foreign assets are reported in the notes to financial statements; immaterial foreign assets are not. Of the 340 firms studied, 200 had no foreign assets, 43 had immaterial foreign assets, and 97 had material foreign assets. We used two dummy variables, one coded 1 if a client did not have foreign assets, the other coded 1 if a client had immaterial foreign assets. Annual reports and 10-K statements provided these data.

Resource Provisions

The literature on auditor-client relationships also suggested measures of the auditors' resource provisions. The capabilities of an audit firm consist of both general auditing expertise and knowledge of issues pertaining to a particular institutional setting. Indeed, prior research has noted considerable variation with respect to industry expertise among auditing firms. For instance, the firm Laventhol and Horwath was known for expertise in real estate, and Ernest and Whinney had a strong reputation for serving banks and financial institutions (Stevens, 1985). Auditor specialization has been measured by an audit firm's market share in a client's industry (Danos & Eichenseher, 1982; Eichenseher & Danos, 1981; Palmrose, 1986), with market share represented by the ratio of the revenue earned by a firm to total revenues of all auditors in that industry. However, since audit firms are private partnerships, such revenue information is not publicly available. Elliott and Korpi (1978) and Simunic (1980) found that the audit fee from a client can be reasonably well explained ($R^2 > .50$) as a linear function of the square root of the client's size, where size is measured by assets. Drawing on this work, several authors of work in the accounting literature (Dopuch & Simunic, 1980; Eichenseher & Danos, 1981; Palmrose, 1986) have estimated an auditor's industry-specific revenues by "summing over" the square root of the assets of an auditor's clients in a given industry. We used the same procedure in our analysis and classified industries on the basis of two-digit SIC codes.

Change in resource provisions was operationally defined as the absolute value of the percentage change in market share from time $t - 2$ to $t - 1$. We used this time frame to ensure that shifts in market share did not result from

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[3] If we had not used such a coding strategy, the coefficient estimates for the signed change in resource requirements would be uninterpretable, given our theoretical argument.

the dissolution events under investigation. We used the absolute value since our argument is that either increases or decreases in resource provisions will affect the likelihood of dissolution. Two variables measured percentage change in market share. A dummy variable for the direction of the change was coded 1 if an increase in market share occurred from $t - 2$ to $t - 1$, and a continuous variable measured the absolute value of the percentage change. The data sources for these measures included Levinthal and Fichman (1988) and COMPUSTAT.

Set of Alternatives

The literature on auditor-client relationships provided measures of the clients' sets of alternatives. Such a set is composed of the audit firms that can provide some degree of the relevant resource, which consists of both general accounting and industry-specific expertise. All auditors that operate in a client's industry constitute its set of alternatives (Danos & Eichenseher, 1986; Eichenseher & Danos, 1981; Palmrose, 1986). As a result, industry concentration statistics provide a measure of the audit market. An increase in industry-specific concentration implies a decrease in the set of available alternatives. The industry concentration statistic selected to measure the client's set of alternatives was the Herfindahl index.[4] This statistic possesses the advantage of capturing the activity of small auditors (Eichenseher & Danos, 1981). Again, industry classification was based on two-digit SIC codes. Two variables measured change in industry concentration. A continuous variable measured the absolute value of the change; again, we used an absolute value because both increases and decreases in the alternative set will increase the probability of the dissolution of a relationship. A dummy variable for the direction of a change was coded 1 if an increase in industry concentration occurred from $t - 2$ to $t - 1$. Levinthal and Fichman (1988) and COMPUSTAT provided the data for calculating concentration indexes.

Individual Attachment

Measures of individual attachment followed from the proposed cumulative feature of attachments. A boundary spanner's attachment to an exchange partner is related to the length of time that the individual engages in activities associated with the relationship, and, therefore, individual attachment is likely to increase with the years of tenure that have elapsed since the formation of an interorganizational relationship. The boundary spanners that are critical to auditor-client relationships include the members of the audit committee of a firm's board of directors (or the board as a whole if an audit committee does not exist), the chief executive officer (CEO), the chief financial officer (CFO), and the chief accounting officer (CAO) (Bacon, 1979; Macchiaverna, 1981; Mautz & Neumann, 1977). Specific measures of indi-

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[4] The Herfindahl statistic was calculated by squaring each auditor's market share in a given industry and summing over all audit firms active in the industry.

vidual attachment were the average tenure of the members of an audit committee or board and the individual tenures of the chief executive, financial, and accounting officers. We used 10-K reports, proxy statements, Moody's *Manuals*, and Standard and Poor's *Register of Corporations, Directors and Executives* to identify the relevant boundary spanners and to determine how long they had been with a firm since the formation of its present auditor-client relationship.

A separate variable was used to represent the attachment associated with each critical boundary-spanning position. The attachments of the chief executive, financial, and accounting officers were measured as the number of years that the officer had served in any of those boundary-spanning positions since the beginning of the interorganizational relationship. The attachment of the members of an audit committee or board was measured as the average number of years served on a board of directors since the beginning of the auditor-client relationship.

Three dummy variables were created to control for overlapping officer positions and the absence of an audit committee. The first variable was coded 1 if a firm's chief executive officer also served as its chief financial officer. Overlapping executive and financial positions existed in 8 of the 340 companies studied. The second variable was coded 1 if the chief financial officer also served as the chief accounting officer. Overlapping financial and accounting positions existed in 158 companies. The third dummy variable was coded 1 if an audit committee did not exist; an audit committee operated in 282 of the 340 companies.

Structural Attachment

The measure of structural attachment also followed from the cumulative feature of attachments. Structural attachment is likely to increase with the duration of a relationship. Therefore, the measure of structural attachment was the number of consecutive years that an incumbent auditor had provided an independent assessment of a client's financial statements. The data sources for this measure included annual reports, proxy statements, and Moody's *Manuals*.

Control Variables

Data for the following four control variables were obtained from annual reports, 10-K statements, and Moody's *Manuals*.

The age of a client was included to control for the potential confound between this variable and other time-dependent measures, such as the degrees of individual and structural attachment. Age was measured as the number of years elapsed since a company's original date of incorporation.

A variable measuring whether each audit opinion was qualified or unqualified was included to control for the effect of qualifications on the likelihood of auditor switching. As noted previously, an audit opinion states whether financial statements fairly present a company's position, conform to generally accepted accounting principles, and consistently apply those prin-

ciples. An unqualified opinion indicates that there was no unresolvable
restriction on the scope of the examination of the financial statements and
that the audit firm had no significant exceptions as to the accounting prin-
ciples reflected, the consistency of their application, and the adequacy of the
information disclosures. A qualified opinion indicates the presence of ma-
terial uncertainties, often the result of changes in accounting methods be-
tween reporting periods, uncertainties as to the valuation of inventories and
receivables, or pending litigation. Another basis for a qualified opinion is
inconsistency with generally accepted accounting principles (Bernstein,
1974). Qualified opinions can create uncertainty for current and prospective
shareholders as to a client's financial situation and, as a result, the client
may be motivated to leave an audit firm in order to obtain a more favorable
opinion. Indeed, several studies have indicated that companies are more
likely to switch their auditors if they have received qualified opinions
(Chow & Rice, 1982; Levinthal & Fichman, 1988). Audit opinion was mea-
sured as a dummy variable with a value of 1 if a qualified opinion was issued
in the year prior to an event.[5]

A variable for incumbent auditors' membership in the Big Eight, the
eight largest U.S. auditing firms,[6] was included to control for a trend toward
use of Big Eight auditors (Eichenseher & Danos, 1981; McConnell, 1984).
Prior research has shown systematic differences in the duration of auditor-
client relationships (Fichman & Levinthal, 1991a,b) depending on type of
audit firm, with client relations with Big Eight firms being longer-lived. We
included this distinction to control for the higher probability of switching if
a current auditor was not a Big Eight firm. Type of auditor was a dummy
variable with a value of 1 if an incumbent was a Big Eight firm.

Financial ratios were included to control for the effect of financial
health on auditor switching. Several studies have found that companies that
are financially distressed are more likely to switch auditors (Mangold, 1987;
Schwartz & Menon, 1985). Schwartz and Menon, for example, sampled com-
panies that filed for bankruptcy and those that did not and found that the
failing companies were more likely to switch auditors in the four years
preceding bankruptcy than were healthy companies during the same period.
To be consistent with this work, we used measures of financial health de-
rived from Altman's (1983) research on corporate bankruptcy. He sampled
bankrupt and nonbankrupt companies and used discriminant analysis to
construct a predictive model of bankruptcy. This model, termed the Z-score
model, contains five financial ratios: working capital to total assets, retained
earnings to total assets, earnings before interest and taxes to total assets, the

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[5] Qualified opinions included "subject to" qualifications, "except for" qualifications de-
void of the auditor's approval, disclaimers of opinion, and adverse opinions (Chow & Rice,
1982).

[6] Circa 1984, the Big Eight accounting firms were Arthur Anderson, Arthur Young, Coopers
and Lybrand, Deloitte Haskins and Sells, Ernst and Whinney, Peat Marwick Mitchell and Co.,
Price Waterhouse and Co., and Touche Ross.

market value of equity to the book value of total liabilities, and sales to total assets. Altman (1983: 106–108) also proposed an overall index of the likelihood of bankruptcy, the Z-score, which is based on a discriminant function.

Thus, Altman's work suggested two formulations for measuring financial health, the five financial ratios and the overall Z-score index. We explored both formulations, calculating financial ratios for the years prior to events. COMPUSTAT provided the necessary financial data.

Table 1 shows the means and standard deviations of the predictor variables for the companies that switched auditors (the cases), the companies that retained their auditors (the controls), and the full data set. Table 2 presents the correlations among the various measures.

Data Analysis

Data were analyzed with logistic regression equations using a "logit" model specifying that the logarithmic odds of a dissolution event are a function of a set of predictor variables (Fienberg, 1980). This model is of the form $\log[P_i/(1 - P_i)] = \beta_0 + \beta_1 X_{i1} + \ldots + \beta_r X_{ir}$, where P_i is the likelihood of dissolution for the ith company, β_0 is a constant, and $X_{i1}, \ldots, X_{ir}$ is a set of predictor variables (Anderson et al., 1980; Schlesselman, 1982). The parameters $\beta_1, \ldots, \beta_r$ represent the effects of the predictor variables on the natural logarithm of the odds of dissolution. The model is estimated using maximum-likelihood procedures. The interpretation of coefficient estimates follows from the logit specification. A unit change in the variable X_j alters the odds of dissolution by the factor $\exp(\beta_j)$ or alters the probability of dissolution by the factor $\exp(\beta_j)/[\exp(\beta_j) + 1]$.

The significance of a variable or set of variables was assessed with the likelihood ratio test.[7] This test compares the goodness of fit of a pair of nested models, with the variable or variables of interest being the constraints that distinguish the models (Bishop, Fienberg, & Holland, 1975; Fienberg, 1980). The measure of goodness of fit, the G^2 statistic, is -2 times the "log likelihood." The likelihood ratio test statistic is calculated by taking the difference between the G^2 values of nested models. Under the null hypothesis, this difference is asymptotically distributed as chi-square (Bishop et al., 1975; Fienberg, 1980). The degrees of freedom for the likelihood ratio statistic are equal to the number of parameters that distinguish the two models.

Although the likelihood ratio test assesses significance, it does not indicate a model's predictive ability. We assessed usefulness with the U^2 statistic (Guadagni & Little, 1983; Hauser, 1978). Derived from information theory, this statistic compares the percentage of uncertainty explained by a model of interest with that explained by a null model (Hauser, 1978). A

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[7] The likelihood ratio test is preferable to the *t*-test for assessing the effect of a single variable. Tests based on the *t*-values of individual coefficients can be misleading in logit analysis (Anderson et al., 1980). Hauck and Donner (1977) showed that Wald's test, which is similar to the *t*-test, can yield p values that are inflated over those yielded by the likelihood ratio test.

TABLE 1
Means and Standard Deviations[a]

Variables	Cases		Controls		Total Sample	
	Means	s.d.	Means	s.d.	Means	s.d.
Controls						
Age	35.694	21.708	41.912	24.136	38.803	23.131
Audit opinion	0.129	0.337	0.059	0.236	0.094	0.292
Type of auditor	0.653	0.477	0.859	0.349	0.756	0.430
Working capital/assets	30.306	21.873	32.434	18.556	31.370	20.281
Retained earnings/assets	20.602	35.597	29.465	24.578	25.034	30.864
Earnings/assets	10.658	11.982	13.393	10.253	12.025	11.219
Equity/liabilities	238.277	548.598	214.274	287.505	226.276	437.479
Sales/assets	1.702	1.072	1.537	0.712	1.619	0.913
Resource requirements						
Change in receivables/assets	0.050	0.069	0.029	0.035	0.039	0.056
Change in inventories/assets	0.041	0.058	0.030	0.039	0.035	0.049
Absence of foreign assets	0.635	0.483	0.541	0.500	0.588	0.493
Immaterial foreign assets	0.147	0.355	0.106	0.309	0.126	0.333
Change in foreign assets/assets	0.042[b]	0.046	0.033[c]	0.047	0.036[d]	0.047
Resource provisions						
Change in market share	0.120	0.262	0.054	0.086	0.087	0.198

TABLE 1 (continued)

Variables	Cases		Controls		Total Sample	
	Means	s.d.	Means	s.d.	Means	s.d.
Set of alternatives						
Change in industry concentration	0.004	0.006	0.004	0.005	0.004	0.005
Structural attachment						
Duration of relationship	17.065	13.389	22.224	15.465	19.644	14.672
Individual attachment[h]						
Overlapping CEO and CFO	0.029	0.169	0.018	0.132	0.024	0.152
Overlapping CFO and CAO	0.482	0.501	0.447	0.499	0.465	0.499
Absence of an audit committee	0.194	0.397	0.147	0.355	0.171	0.377
Tenure of CEO	8.476	6.652	10.753	6.289	9.615	6.563
Tenure of CFO	4.959	4.913	8.035	5.124	6.497	5.244
Tenure of CAO	3.868[e]	4.035	5.845[f]	4.509	4.860[g]	4.386
Average tenure of directors	6.755	3.541	9.090	4.521	7.923	4.220

[a] $N = 170$ for the cases and 170 for the controls.
[b] $N = 37$.
[c] $N = 60$.
[d] $N = 97$.
[e] $N = 167$.
[f] $N = 168$.
[g] $N = 335$.
[h] CEO = chief executive officer; CFO = chief financial officer; CAO = chief accounting officer.

standard null model is the equally likely model, wherein the parameters of the predictor variables are set to zero. Under this hypothesis, $U^2 = 1 - L(X)/L_o$, where $L(X)$ is the log likelihood of the explanatory model and L_o is the log likelihood of the null model (Hauser, 1978). The U^2 statistic can be interpreted like a R^2. Both statistics range from 0 to 1, with 1 indicating that a model predicts perfectly (Guadagni & Little, 1983; Hauser, 1978). The value of U^2, however, tends to be lower than the value of R^2 for a model that fits the data well (Guadagni & Little, 1983).

The sets of variables were analyzed hierarchically. We first developed a model composed of the control variables. The control model served as a basis for examining the effects of change in resource fit variables on the likelihood of dissolution. We tested the effects of these variables as a set by determining if their addition improved the fit of the control model. The resulting change in resource fit model provided the comparison standard for examining the main effects of attachment. Interactions between change in resource fit and attachment variables were assessed in relation to the model containing all the main effect terms.

The effect of individual variables within each set was assessed by comparing a model excluding the variable of interest with a model containing the full set of variables. For example, the effect of change in receivables to assets was tested by comparing a model containing all of the change in resource fit variables except for change in the ratio of receivables to assets with the full change in resource fit model. This procedure provided estimates of the effects of individual variables while controlling for the effects of the other variables in the set.

RESULTS

Controls

The control variables as a set were assessed in comparison to a model containing one variable, the constant term. The constant term model was chosen to serve as the null model in evaluating U^2 and for this reason, the value of U^2 for this model was 0. We conducted preliminary analyses to determine which of the two formulations of financial health, the five financial ratios individually or the overall Z-score index, would be included in the control model. The Z-score index did not improve the fit of the constant term model ($\chi^2 = 0.04$, $df = 1$, $p > .10$). As a group, however, the five financial ratios provided a significant improvement in fit ($\chi^2 = 17.65$, $df = 5$, $p < .01$). Tests of the contribution of each financial variable to this model indicated a negative effect for retained earnings to assets ($\chi^2 = 4.23$, $df = 1$, $p < .05$, $\beta = -.01$) and earnings to assets ($\chi^2 = 4.26$, $df = 1$, $p < .05$, $\beta = -.03$) and a positive effect for equity to liabilities ($\chi^2 = 4.56$, $df = 1$, $p < .05$, $\beta = .001$) and sales to assets ($\chi^2 = 5.62$, $df = 1$, $p < .05$, $\beta = .304$). Given

TABLE 2
Pearson Correlation Matrix[a]

Variables	1	2	3	4	5	6	7	8	9	10
Controls										
1. Age										
2. Audit opinion	0.01									
3. Big 8/non-Big 8	0.10	0.09								
4. Working capital/ assets	0.04	−0.23	−0.09							
5. Retained earnings/ assets	0.16	−0.29	0.03	0.39						
6. Earnings before interest and taxes/assets	0.00	−0.29	0.01	0.30	0.46					
7. Equity/liabilities	−0.08	−0.09	−0.17	0.23	0.20	0.42				
8. Sales/assets	0.06	−0.05	−0.06	0.07	0.07	0.10	−0.11			
Change in resource fit										
9. Change in receivables/assets	−0.12	0.08	−0.13	−0.13	−0.36	−0.11	0.09	−0.05		
10. Change in inventories/assets	−0.01	0.17	−0.26	−0.02	−0.26	−0.12	0.08	0.14	0.46	
11. Absence of foreign assets	−0.09	−0.04	−0.20	0.04	−0.05	−0.04	0.07	0.20	0.10	0.09
12. Immaterial foreign assets	0.01	0.03	0.09	−0.02	0.04	0.01	−0.04	−0.10	−0.01	−0.05
13. Change in foreign assets/assets	−0.37[b]	−0.10[b]	−0.08[b]	−0.26[b]	−0.19[b]	−0.09[b]	0.12[b]	−0.10[b]	0.27[b]	0.14[b]
14. Change in market share	−0.08	−0.00	−0.25	0.00	−0.02	0.00	0.07	−0.01	0.15	0.04
15. Change in industry concentration	−0.00	0.06	0.06	−0.08	−0.02	−0.01	−0.06	0.07	−0.01	−0.03
Attachment										
16. Duration	0.54	0.02	0.13	0.01	0.20	−0.02	−0.08	−0.03	−0.22	−0.03
17. Overlapping CEO and CFO	0.03	0.02	−0.14	0.10	−0.02	0.04	0.04	−0.02	0.04	0.12
18. Overlapping CFO and CAO	−0.19	0.02	−0.12	0.03	−0.04	−0.01	0.11	0.02	0.06	0.09
19. Absence of an audit committee	−0.16	0.12	−0.18	0.01	−0.05	−0.02	0.06	0.14	0.17	0.23
20. Tenure of CEO	0.08	−0.09	0.12	0.08	0.19	0.11	−0.02	0.08	−0.11	−0.09
21. Tenure of CFO	0.14	−0.11	0.10	0.12	0.22	0.11	0.04	−0.02	−0.13	−0.09
22. Tenure of CAO	0.10[d]	−0.14[d]	0.02[d]	0.06[d]	0.19[d]	0.11[d]	0.04[d]	0.01[d]	−0.15[d]	−0.12[d]
23. Average tenure of directors	0.19	0.02	0.06	0.03	0.22	0.07	−0.06	0.02	−0.21	−0.05

[a] For $N = 340$, correlations greater than .11 are significant at $p < .05$, and those greater than .14 are significant at $p < .01$.

[b] $N = 97$.

[c] Excluding overlapping positions, $r = .33$, $N = 332$, $p < .001$.

[d] $N = 335$.

[e] $N = 96$.

[f] Excluding overlapping positions, $r = .18$, $N = 334$, $p < .01$.

[g] Excluding overlapping positions, $r = .07$, $N = 177$, $p > .05$.

TABLE 2 (continued)

11	12	13	14	15	16	17	18	19	20	21	22
−0.46											
0.05	0.06	0.01[b]									
0.07	0.03	−0.06[b]	0.08								
−0.10	−0.06	−0.23[b]	−0.08	0.07							
0.01	−0.06	0.03[b]	−0.01	−0.05	−0.06						
0.18	−0.09	0.18[b]	0.08	0.02	−0.12	−0.11					
0.16	−0.10	0.02[b]	0.17	0.03	−0.15	0.14	0.16				
−0.07	−0.01	−0.02[b]	−0.11	0.01	0.20	0.07	0.01	0.01			
−0.03	−0.01	0.01[b]	−0.08	0.04	0.17	0.18	−0.14	0.00	0.34[c]		
0.07[d]	−0.08[d]	−0.08[e]	−0.07[d]	0.05[d]	0.15[d]	−0.01[d]	0.19[d]	0.04[d]	0.18[d,f]	0.47[d,g]	
−0.00	−0.06	−0.15[b]	−0.05	−0.03	0.39	0.04	−0.10	0.07	0.29	0.28	0.18[d]

these results, we chose the five individual ratios to represent financial condition.

We then examined the combined effects of all the specified controls: age, types of audit opinion and auditor, and the five financial ratios. This model significantly improved the fit of the constant term model ($\chi^2 = 41.56$, $df = 8$, $p < .001$). Table 3 presents the estimated coefficients, their standard errors, and the U^2 for the control model and subsequent main effect models.

Additional analyses examined the individual effects of each control variable.[8] The null model in each test contained all the variables in the preceding control model except for the variable of interest. The alternative model for each comparison was the full control model. In the control model, the coefficient estimates for the age of the client ($\chi^2 = 3.05$, $df = 1$, $p < .10$) and the presence of a qualified audit opinion ($\chi^2 = 3.63$, $df = 1$, $p < .10$) were in the expected direction but were marginally significant.[9] Clients with non–Big Eight auditors were more likely to switch than those with Big Eight firms ($\chi^2 = 17.43$, $df = 1$, $p < .01$). Individual tests of the financial ratios revealed a significant, positive effect for the ratio of sales to assets ($\chi^2 = 4.81$, $df = 1$, $p < .05$). The other financial ratios did not achieve significance: working capital to assets ($\chi^2 = 0.24$, $df = 1$, $p > .10$), retained earnings to assets ($\chi^2 = 1.75$, $df = 1$, $p > .10$), earnings to assets ($\chi^2 = 2.32$, $df = 1$, $p > .10$), and equity to liabilities ($\chi^2 = 1.28$, $df = 1$, $p > .10$). As a group, however, the five financial variables marginally improved the fit of the model containing age, type of audit opinion, and type of auditor ($\chi^2 = 9.82$, $df = 5$, $p < .10$). In combination, these results indicated that the full control model provided a good basis for subsequent analyses. We chose this model as a comparison standard for examining the effects of change in resource fit on the likelihood of dissolution.

Change in Resource Fit

The first hypothesis predicts a positive relationship between the likelihood of dissolution and the magnitude of change in resource requirements, resource provisions, and set of alternatives. Before testing the hypothesis itself, we empirically evaluated our claim that the effect of these changes in resource fit are independent of the direction of change. The results of the preliminary analyses did not reveal an effect for any of the direction variables on audit switching: direction of change in the ratio of receivables to assets ($\chi^2 = 0.11$, $df = 1$, $p > .10$), direction of change in inventories to assets ($\chi^2 = 0.10$, $df = 1$, $p > .10$), direction of change in foreign assets to assets ($\chi^2 = 0.42$, $df = 1$, $p > .10$), direction of change in market share (χ^2

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[8] All β estimates are reported in Tables 3 and 4.

[9] In tests of control variables and exploratory analyses, we used a more liberal $p < .10$ statistical significance level.

TABLE 3
Logistic Regression Analysis Estimates[a]

Variables	Constant Term	Control	Resource Fit	Attachment
			Models[b]	
Constant	0.00	1.14	0.18	1.46
	(0.11)	(0.44)	(0.58)	(0.69)
Age		−0.01	−0.01	−0.01
		(0.01)	(0.01)	(0.01)
Audit opinion		0.81	0.81	0.81
		(0.44)	(0.45)	(0.49)
Big Eight/non–Big Eight		−1.17	−1.06	−1.01
		(0.29)	(0.31)	(0.34)
Working capital/assets		−0.00	−0.00	−0.00
		(0.01)	(0.01)	(0.01)
Retained earnings/assets		−0.01	−0.00	0.00
		(0.01)	(0.01)	(0.01)
Earnings/assets		−0.02	−0.02	−0.02
		(0.01)	(0.01)	(0.02)
Equity/liabilities		0.00	0.00	0.00
		(0.00)	(0.00)	(0.00)
Sales/assets		0.29	0.32	0.34
		(0.14)	(0.14)	(0.16)
Change in receivables/assets			6.41	4.42
			(2.98)	(3.12)
Change in inventories/assets			−0.13	−0.38
			(3.30)	(3.58)
Absence of foreign assets			0.28	0.45
			(0.34)	(0.37)
Immaterial foreign assets			0.81	0.80
			(0.44)	(0.47)
Change in foreign assets/assets			0.77	2.06
			(4.98)	(5.11)
Change in market share			2.04	1.77
			(1.28)	(1.38)
Change in industry concentration			12.40	22.54
			(23.35)	(25.84)
Duration of relationship				0.00
				(0.01)
Overlapping CEO and CFO positions				0.60
				(0.95)
Overlapping CFO and CAO positions				−0.20
				(0.28)
Absence of an audit committee				−0.19
				(0.38)
Tenure of CEO				−0.00
				(0.02)
Tenure of CFO				−0.09
				(0.03)
Tenure of CAO				−0.04
				(0.04)

TABLE 3 (continued)

| | Models[b] | | | |
Variables	Constant Term	Control	Resource Fit	Attachment
Average tenure of directors				−0.11
				(0.04)
Observations	340	340	340	335
Parameters	1	9	16	24
G^2	471.34	429.78	413.30[b]	372.19
U^2	.00	.09	.12	.20
Difference in G^2		41.56	16.48	36.03
df		8	7	8
p		<.001	<.05	<.001

[a] Statistics in parentheses are standard errors.
[b] For $N = 335$, $G^2 = 408.26$.

= 0.00, $df = 1$, $p > .10$), and direction of change in industry concentration ($\chi^2 = 0.56$, $df = 1$, $p > .10$). Given these confirmatory empirical results and our prior theoretical argument regarding the independence of the direction of change on the likelihood of the dissolution of a relationship, we excluded these variables from subsequent analyses.

In contrast to the directional variables, as a group the measures of absolute change in resource fit significantly improved the fit of the control model ($\chi^2 = 16.48$, $df = 7$, $p < .05$). Analyses of the individual effects of the measures of change in resource fit compared a model containing all the control and resource fit variables minus the variable of interest with the full resource fit model. As predicted, the results indicated a significant, positive effect for change in the ratio of receivables to assets ($\chi^2 = 5.11$, $df = 1$, $p < .05$). The market share coefficient was in the estimated direction but not significant ($\chi^2 = 3.75$, $df = 1$, $p > .05$). The results did not reveal an effect for the other measures of change in resource fit: inventories to assets ($\chi^2 = 0.00$, $df = 1$, $p > .05$), foreign assets to assets ($\chi^2 = 0.02$, $df = 1$, $p > .05$), and industry concentration ($\chi^2 = 0.29$, $df = 1$, $p > .05$). In addition, we conducted exploratory analysis of changes over a two-year period to assess whether year-to-year measures of changes in resource fit were appropriate. In the analysis of individual effects, change in market share from year $t - 3$ to year $t - 1$ had a significant, positive effect on the likelihood of dissolution ($\chi^2 = 4.99$, $df = 1$, $p < .05$; $\beta = 1.58$), whereas none of the other resource fit variables achieved significance.

The results presented in this section provide some support for Hypothesis 1. As a group, measures of change in resource fit had a significant effect of the likelihood of an auditor switch. Individually, change in the ratio of receivables to assets, a measure of clients' resource needs, was positively related to auditor switching.

Attachment

The second hypothesis predicts a negative relationship between structural or individual attachment and the likelihood of dissolution.[10] The first test assessed the combined effects of all the variables related to attachment, comparing the resource fit model with a model containing all the attachment measures. The variables unique to this model were the measure of structural attachment (the duration of a relationship), the controls for overlapping executive positions and the absence of an audit committee, and the measures of individual attachment (the tenures of a firm's chief executive, financial, and accounting officers and the average tenure of the members of its audit committee). As a group, those variables significantly improved the fit of the resource model ($\chi^2 = 36.08$, $df = 8$, $p < .001$).

Each test of the individual effects of the measures of attachment compared a model containing all the attachment variables, except for the attachment variable of interest, with the full main effects model. This is a conservative test of Hypothesis 2 since any covariation shared by two attachment variables will be treated as part of the control model. Tests of each of the measures of individual attachment revealed significant, negative effects for the tenure of the chief financial officer ($\chi^2 = 8.70$, $df = 1$, $p < .01$) and the average tenure of the audit committee ($\chi^2 = 10.54$, $df = 1$, $p < .01$). The results were not significant for the tenures of the chief executive ($\chi^2 = 0.00$, $df = 1$, $p > .05$) and accounting officers ($\chi^2 = 1.13$, $df = 1$, $p > .05$).

The measure of structural attachment was not significant ($\chi^2 = 0.03$, $df = 1$, $p > .05$). Since the correlations between the duration of a relationship and the measures of individual attachment ranged from .15 to .39, we also assessed the effect of duration relative to a model in which the other attachment variables were absent; this was a more liberal test of the hypothesis than those just reported. This analysis compared the change-in-resource-fit model with a model containing all the control and resource fit variables plus the duration of the relationship. The results of this liberal test of the effect of duration on the likelihood of dissolution still did not achieve statistical significance ($\chi^2 = 1.48$, $df = 1$, $p > .05$).

Exploratory analyses examined whether a logarithmic transformation of the attachment variables would provide a better specification of the relationship between attachment and likelihood of dissolution. These analyses explored the possibility that attachment accrues at a diminishing rate, as is often the case with time-related variables (Cohen & Cohen, 1983). We logarithmically transformed the attachment variables and repeated the preceding

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[10] It is important to note that the sample selection and data collection procedures did not impose any relationship between the duration of an auditor-client relationship and its dissolution. For the cases, the duration variable was the number of years an auditor-client relationship persisted prior to its termination, and for the controls it was the number of years the relationship persisted prior to what is essentially a point of "right-censoring" (Allison, 1984). If there were no causal link between duration and risk of dissolution, the duration variable would have the same distribution for the cases and the controls.

analyses using the transformed variables. The results were the same as those of the original analyses, with one exception. The liberal test (all individual attachment variables absent from the comparison model) of the effect of duration on the likelihood of dissolution achieved a marginal level of significance when duration was represented by a logarithmic transformation ($\chi^2 = 3.01$, $df = 1$, $p < .10$; $\beta = -.34$).[11]

In combination, these results support the predicted relationship between individual attachment and the likelihood of dissolution but provide little support for the effect of structural attachment. In particular, two measures of individual attachment were found to have a significant, negative effect on auditor switching: the years of tenure elapsed since the formation of a relationship for both the chief financial officer and the members of an audit committee.

Interactions of Attachment and Changes in Resource Fit

The third hypothesis predicts a negative interaction between attachment and change in resource fit. This hypothesis states that increases in attachment attenuate the effect of change in resource fit on the likelihood of dissolution. We first examined sets of interactions, with the basis of comparison being the model containing the main effects of changes in resource fit and attachment. Each set was composed of the interactions between one of the five attachment variables (duration, board tenure, CEO tenure, CFO tenure, and CAO tenure) and the five measures of change in resource fit: the ratios of receivables to assets, inventories to assets, and foreign assets to assets, market share, and industry concentration. Subsequent analyses tested specific interactions within the significant sets.

As a group, the interactions between the tenure of the chief financial officer and each of the measures of change in resource fit significantly improved the main effects model ($\chi^2 = 14.04$, $df = 5$, $p < .05$). The set of interactions between the tenure of the chief accounting officer and the resource fit variables also significantly improved the main effects model ($\chi^2 = 19.86$, $df = 5$, $p < .01$). Table 4 presents the estimated coefficients, their standard errors, and U^2s for these models. The other sets of interactions were not significant.

Further analyses tested specific interactions within the two significant models. Again, each analysis compared a model containing all the main effect variables and the five interaction terms, minus the term of interest, with the full interaction model. We first examined the interactions between the tenure of the chief financial officer and the change-in-resource-fit variables. The results indicated a significant, negative interaction between the

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[11] Exploratory analyses also examined nonmonotonic formulations of duration, using dummy variables to represent duration. The evidence for a nonmonotonic effect of duration was relatively weak; nonetheless, the individual attachment results were still robust when we allowed for the possibility of a nonmonotonic duration effect.

TABLE 4
Logistic Regression Analysis Estimates

Variables	Models[a] CFO Interaction	CAO Interaction
Constant	1.33	1.44
	(0.75)	(0.76)
Age	0.00	−0.01
	(0.01)	(0.01)
Audit opinion	0.85	0.94
	(0.50)	(0.50)
Big Eight/non-Big Eight	−1.07	−1.06
	(0.35)	(0.35)
Working capital/assets	0.00	0.00
	(0.01)	(0.01)
Retained earnings/assets	0.00	0.00
	(0.01)	(0.01)
Earnings/assets	−0.02	−0.02
	(0.02)	(0.02)
Equity/liabilities	0.00	0.00
	(0.00)	(0.00)
Sales/assets	0.42	0.40
	(0.17)	(0.17)
Change in receivables/assets	16.57	16.38
	(6.59)	(6.18)
Change in inventories/assets	−0.67	−5.80
	(5.78)	(4.97)
Absence of foreign assets	0.47	0.55
	(0.38)	(0.42)
Immaterial foreign assets	1.01	0.97
	(0.48)	(0.51)
Change in foreign assets/assets	3.35	17.52
	(8.18)	(11.31)
Change in market share	0.07	0.23
	(2.05)	(2.04)
Change in industry concentration	−72.20	−69.76
	(46.30)	(46.79)
Duration of relationship	0.00	0.00
	(0.01)	(0.01)
Overlapping CEO and CFO positions	0.91	0.84
	(1.02)	(0.97)
Overlapping CFO and CAO positions	−0.19	−0.18
	(0.29)	(0.30)
Absence of an audit committee	−0.13	−0.30
	(0.40)	(0.40)
Tenure of CEO	0.01	0.00
	(0.02)	(0.02)
Tenure of CFO	−0.13	−0.09
	(0.05)	(0.03)
Tenure of CAO	−0.03	−0.07
	(0.04)	(0.07)

TABLE 4 (continued)

Variables	Models[a]	
	CFO Interaction	**CAO Interaction**
Average tenure of directors	−0.11	−0.12
	(0.04)	(0.04)
Tenure of CFO by change in receivables/assets	−1.70	
	(0.85)	
Tenure of CFO by change in inventories/assets	0.05	
	(0.81)	
Tenure of CFO by change in foreign assets/assets	0.26	
	(0.90)	
Tenure of CFO by change in market share	0.34	
	(0.34)	
Tenure of CFO by change in industry concentration	11.32	
	(6.37)	
Tenure of CAO by change in receivables/assets		−2.80
		(1.42)
Tenure of CAO by change in inventories/assets		1.42
		(0.86)
Tenure of CAO by change in foreign assets/assets		−3.14
		(1.93)
Tenure of CAO by change in market share		0.45
		(0.52)
Tenure of CAO by change in industry concentration		15.04
		(7.76)
Observations	335	335
Parameters	29	29
G^2	358.14	352.32
U^2	.23	.24
Difference in G^2 from the main effects model	14.04	19.86
df	5	5
p	<.05	<.01

[a] Statistics in parentheses are standard errors.

tenure of the chief financial officer and the change in the ratio of receivables to assets ($\chi^2 = 4.75$, $df = 1$, $p < .05$). The direction of this interaction is consistent with the prediction. As shown in Figure 2, the form of the joint effect indicates that the greater the tenure of a chief financial officer, the lower was the effect of change in receivables to assets on the likelihood of dissolution. A significant, positive interaction, however, was found between the tenure of the chief financial officer and change in industry concentration ($\chi^2 = 6.10$, $df = 1$, $p < .05$). The direction of this interaction is counter to predictions. None of the other interaction terms were significant.

Analyses of the interactions between the tenure of a firm's chief accounting officer and the change-in-resource-fit variables yielded similar results. Consistent with Hypothesis 3, the results indicated a significant, negative interaction between the tenure of the chief accounting officer and

FIGURE 2
Joint Effect of Chief Financial Officer Tenure and Change in the Ratio of Receivables to Assets[a]

Percentile Change in Receivables to Assets
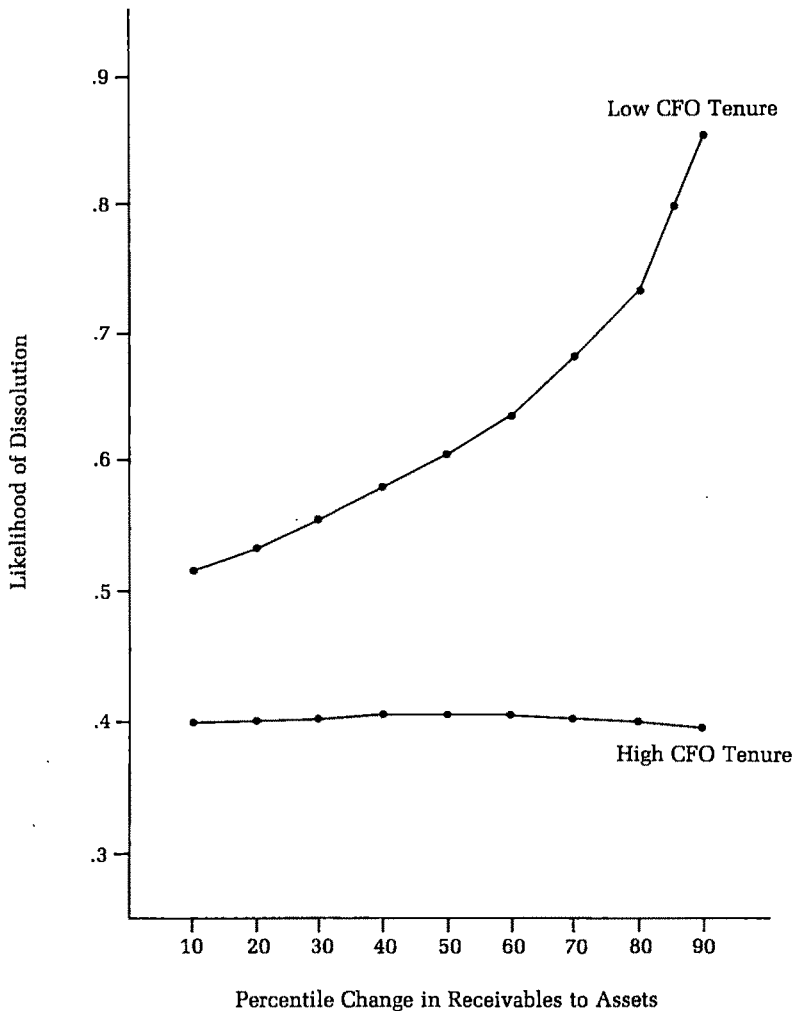
[a] We derived the plotted values from the CFO interaction model by calculating predicted probabilities for different values of the tenure of the CFO (low = 1 year, high = 10 years) and change in receivables to assets (.0031, .0064, .0111, .0167, .0221, .0290, .0401, .0525, .0925) while fixing the other variables at observed proportions or mean values (Cohen & Cohen, 1983; Fox, 1987).

change in receivables to assets ($\chi^2 = 5.56$, $df = 1$, $p < .05$) and between the tenure of this officer and change in foreign assets to total assets ($\chi^2 = 4.06$, $df = 1$, $p < .05$). Counter to predictions, the analyses revealed a significant, positive interaction between the tenure of the chief accounting officer and change in industry concentration ($\chi^2 = 3.92$, $df = 1$, $p < .05$). None of the other interaction terms were significant.

In summary, the results of the analyses of the joint effect of attachment and change in resource fit provided mixed support for Hypothesis 3. Consistent with predictions, the tenures of the chief financial and accounting officers attenuated the effect of change in the ratio of receivables to assets on the likelihood of dissolution. The tenure of the chief accounting officer also reduced the effect of change in foreign assets to assets on auditor switching. Other joint effects, however, were counter to predictions. The tenures of the chief financial and accounting officers enhanced the effect of change in industry concentration on the likelihood of dissolution.

A plausible explanation for these positive interactions is that sensitivity to changes in the audit market requires a knowledge base that is acquired from years of managerial experience. Even a financial or accounting officer with little tenure is likely to be knowledgeable about internal accounting issues, since such knowledge is a prerequisite for a financial management position. Such an officer, however, need not be knowledgeable about the market for audit services. A considerable amount of experience may be necessary to develop enough information about the audit market to be sensitive to changes in industry concentration. This learning explanation implies that tenure would be associated with sensitivity to change in the audit market but not with sensitivity to internal resource needs, as indicated by the results. The learning argument indicates a weakness in the measure of attachment. Although the analysis of individual attachment did control for some time-related factors, such as company age and the duration of a relationship, it did not control for learning or other possible time-related phenomena. Future research needs to explore measures of attachment that are not time-dependent, such as proxies for the level of specialized investment and the strength of personal ties.

DISCUSSION

The results of this study of auditor-client relationships support the hypothesized roles of resource fit and individual attachment in the dissolution of interorganizational arrangements. Change in clients' resource needs increased the likelihood of their switching auditors. The individual attachments of a firm's chief financial officer and the members of the audit committee of its board of directors decreased the likelihood of dissolution. Moreover, the individual attachments of the chief financial and accounting officers attenuated the effect of change in resource needs on auditor switching. These results are consistent with the thesis that change in resource fit provides an impetus for dissolution, whereas individual attachments counter pressures for change.

A resource dependence perspective does not provide a fully satisfactory accounting of these results. This perspective would suggest that as the fit between a client and an auditor declines, the likelihood of dissolution increases. This prediction holds, but we found that degree of interorganiza-

tional attachment attenuated the effect of change in resource fit. To stay within the framework of the resource dependence perspective, we could simply interpret attachment as an additional resource. However, attachment is a peculiar resource in that it is a property of the relationship between exchange partners and not of either exchange partner. As a result, it is unclear how a high degree of attachment might mitigate an imbalance of power in other resource dimensions. At a minimum, our findings suggest that static assessments of resource dependency that ignore the prior history of a relationship are incomplete. We would go further and argue, following theoretical work on social exchange such as Cook (1977) and Cook and Emerson (1978), that attachment is a distinct attribute of interorganizational relationships.

The most distinctive aspect of the results is the role of individual attachments in the dynamics of interorganizational relationships. In particular, it is interesting to note which individual attachments were significant. Although CEOs are arguably the most powerful actors in organizations, their tenure had no significant effect on the persistence of audit relationships. The individual attachment findings are consistent with the roles of the chief officers and the audit committee in auditor selection decisions (Brealey & Myers, 1984; Macchiaverna, 1981). The results suggest that a firm's chief executive officer has little involvement in these decisions, while the financial and accounting officers oversee resource fit issues. With respect to the members of an audit committee, the results suggest that they affect selection decisions but do not determine resource fit. Institutional pressures to maintain independence in an auditor-client relationship may limit a chief executive officer's role in auditor selection decisions. Chief financial and accounting officers, though under similar institutional pressures, are likely to have major roles in auditor selection because of their responsibility for the financial function. These officers are directly responsible for accounting controls, both internally and externally. A chief executive officer is unlikely to become involved in such working relationships. As a result, the chief financial and accounting officers are likely to be more sensitive to issues of resource fit than the other relevant boundary spanners. The members of an audit committee, on the other hand, are accountable for auditor selection but not for the determination of accounting needs. They have a major role in hiring and firing decisions but are likely to leave the assessment of resource fit to financial executives.

Levinthal and Fichman (1988) argued that both an auditor and a client develop relationship-specific skills over time through learning by doing. Such relationship-specific capabilities create an incentive for both sides to continue the auditor-client relationship. Levinthal and Fichman did not, however, distinguish between individual and structural attachments. Relationship-specific skills can be embodied both in individuals and in routines that are institutionalized and divorced from particular individuals. The present study teased out the effects of individual and structural attachments. We found that attachment develops largely at the individual level. This

result may reflect the particular nature of the relationship studied. Auditor-client arrangements depend on human capital investments but require little, if any, investment in physical capital. In exchange relationships in which there are large investments in specialized physical capital, structural attachments would likely play a significant role. Joskow (1987) showed this in the case of coal suppliers and electric utilities, where large capital investments are required to initiate and maintain a supplier relationship.

Given that an auditor-client relationship is a professional service relationship, the exchange may rely on personal knowledge and trust. As a result, the development of attachments between boundary spanners may be critical to the maintenance of the relationship. Knowledge that there will be continued interactions in the future is likely to reinforce this development of attachment. Heide and Miner (1990) suggested that anticipated future interactions lead to more cooperative behaviors. They attributed this effect to what they termed "the shadow of the future," arguing that the knowledge that a relationship may be long-lasting influences actors to cooperate in the present so that future interactions will not be adversely affected. It is likely that this shadow of the future further strengthens auditor-client attachments.

Another element that may affect the importance of individual and structural attachments is the tendency for interorganizational relationships to become institutionalized. Van de Ven (1976) argued that over time formalized procedures tend to replace the coordination of interorganizational activities through personal contact. Such a pattern would imply that individual attachments would be important early in a relationship but diminish in significance with its persistence. We conducted exploratory analyses to examine this possibility by assessing the interaction of duration and the individual attachment measures. As a set, these four interaction terms did not significantly improve the fit of the full main effects model ($\chi^2 = 4.89$, $df = 4$, $p > .05$). This result suggests that in the context of auditor-client relationships, the substitutability of individuals for structural mechanisms is limited, either because of difficulties in standardizing interpersonal activities or the need to maintain flexibility in the coordination process.

Our results for the effect of individual tenure on interorganizational dissolution support arguments posed by Macaulay (1963) and others emphasizing the importance of the relationships between boundary spanners in managing exchange relationships. The attachment that develops between individuals in boundary-spanning roles can be viewed as a mechanism that reduces transaction costs, but it also suggests the concept of embeddedness (Granovetter, 1985). Granovetter argued that "departing from pure economic motives, continuing economic relations often become overlaid with social content that carries strong expectations of trust and abstention from opportunism" (1985: 490). Individual attachments in interorganizational relationships would seem to be multidimensional, reflecting transactional efficiencies as well as the features of social networks in which boundary spanners are embedded.

Empirically, it is difficult to distinguish between attachments that re-

flect transaction efficiency and those that reflect the embeddedness of a relationship, as the two properties are likely to covary. Indeed, it is hard to imagine the development of highly specific relationship capital that does not engender some element of social ties. Conversely, as the quote by Granovetter suggests, embedded relationships should reduce opportunism and, thereby, transaction costs. To better disentangle the two explanations, it may be useful to go beyond a consideration of dyadic relationships in one task domain to a network of relationships in multiple task domains. For instance, suppose that two organizations are involved in exchange relationships across multiple task domains that are functionally independent. In the context of auditor-client relationships, these could be providing consulting, tax advice, and audits. If the tasks are functionally independent, from a transaction cost perspective, a break in one relationship should have no effect on the other relationships. In contrast, an embeddedness perspective would suggest that a break in one relationship would weaken ties with respect to the remaining relationships. We did not set out to distinguish attachments that derive from transactional efficiencies and those that reflect embeddedness, but this would seem to be a promising path to pursue for further understanding individual attachments.

Our results suggest other potentially fruitful avenues for exploration. First, they provide an impetus for further examination of professional relationships (Fichman & Levinthal, 1991b). The qualities usually ascribed to professionals—such as being bound by professional norms and maintaining some detachment from clients—are not consistent with our results. Professional audit firms would seem to become enmeshed in a complex of ties in the course of professional engagements. This embeddedness is a natural result of the relationship between a client and an audit firm, but it is clearly at variance with normative expectations about professional detachment and avoidance of personal ties to clients.

A second important direction suggested here is that there may be other consequential attachments within a larger network of relationships in which an auditor and a client are involved. For example, the members of an audit committee are linked with other organizations and boards of directors and may bring some element of those attachments with them into any particular auditor-client relationship. It would be useful to explore the impacts of these broader linkages on the nature and persistence of auditor-client relationships.

An important consequence of the dyadic attachment between auditor and client, which we are currently exploring, is the impact of these relationship features on auditor performance and audit quality. If auditor-client attachments are partly sustained by the social qualities of interpersonal ties, such considerations as audit quality may be given less weight than would be expected in a more strictly self-interested relationship. This suggests that long-lived relationships may be at greater risk of performance problems with respect to audit quality. Thus, embeddedness may have implications beyond just inertia and the persistence of relationships. If firms persist in relation-

ships with relatively poor resource fits, the opportunity for the more powerful partner to, for example, exploit the situation might increase. If this party were the auditor, such exploitation might take the form of reduced effort and consequently reduced audit quality. If the more powerful party were the client, it might take the form of more aggressive and risky accounting practices. In either case, relationships sustained by a high degree of attachment despite substantial asymmetries in power may have a higher likelihood of performance problems than other relationships. If an audit is of low quality, investors, debt holders, and others who rely on the audit may be taking a greater risk than is reflected by the client's financial statement and the auditor's opinion.
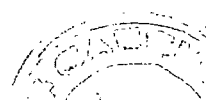
Although we have couched these conclusions in terms of the relationships of auditors and their clients, it would appear that in general, a mixture of transactional, resource fit, and embeddedness considerations drives supplier-buyer relationships. Indeed, issues of attachment may become more salient as many firms choose to enter close relationships with a few supplying firms. For instance, the movement toward just-in-time inventory practices creates an incentive to reduce suppliers, often until one firm is a sole-source supplier. Individual ties often mediate such relationships, which allow for greater flexibility and responsiveness than do institutionalized routines. As a result, both the shadow of the future and the embeddedness of relations will act to further bind the parties. Attachments may create a counterforce to change in such situations, leading to reduced search for alternatives when the inherent quality of a match is reduced. The perspective developed here to explore the professional relations of auditors and their clients may be useful to researchers examining such interorganizational arrangements.

REFERENCES

Adams, S. J. 1976. The structure and dynamics of behavior in organizational boundary roles. In M. Dunnette (Ed.), *Handbook of organizational and industrial psychology:* 1175–1199. Chicago: Rand McNally.

Aiken, M., & Hage, J. 1968. Organizational interdependence and intra-organizational structure. *American Sociological Review,* 33: 912–930.

Aldrich, H. E. 1979. *Organizations and environments.* Englewood Cliffs, NJ: Prentice-Hall.

Allison, P. D. 1984. *Event history analysis: Regression for longitudinal event data.* Beverly Hills, CA: Russell Sage.

Altman, E. I. 1983. *Corporate financial distress: A complete guide to predicting, avoiding, and dealing with bankruptcy.* New York: Wiley.

Anderson, S., Auquier, A., Hauck, W. W., Oakes, D., Vandaele, W., & Weisberg, H. I. 1980. *Statistical methods for comparative studies.* New York: Wiley.

Bacon, J. 1979. *Corporate directorship practices: The audit committee.* Publication 766. New York: Conference Board.

Bedingfield, J. B., & Loeb, S. E. 1974. Auditor changes—An examination. *Journal of Accountancy,* 137 (March): 66–69.

Bernstein, L. A. 1974. *Financial statement analysis: Theory, application, and interpretation.* Homewood, IL: Irwin.

Bishop, Y. M., Fienberg, S. E., & Holland, P. W. 1975. *Discrete multivariate analysis: Theory and practice.* Cambridge, MA: MIT Press.

Blau, P. 1964. *Exchange and power in social life.* New York: Wiley.

Borys, B., & Jemison, D. B. 1989. Hybrid organizations as strategic alliances: Theoretical issues in organizational combinations. *Academy of Management Review,* 14: 234–249.

Brealey, R., & Meyers, S. 1984. *Principles of corporate finance* (2d ed.). New York: McGraw-Hill.

Burton, J. C., & Roberts, W. 1967. A study of auditor changes. *Journal of Accountancy,* 123 (April): 31–36.

Carmichael, D. R., & Willingham, J. J. 1985. *Perspectives in auditing.* New York: McGraw-Hill.

Carpenter, C. G., & Strawser, R. H. 1971. Displacement of auditors when clients go public. *Journal of Accountancy,* 131 (June): 55–58.

Chow, C. W., & Rice, S. J. 1982. Qualified audit opinions and auditor switching. *Accounting Review,* 57: 326–335.

Cohen, J., & Cohen, P. 1983. *Applied multiple regression/correlation analysis for the behavioral sciences* (2d ed.). Hillsdale, NJ: Erlbaum.

Cook, K. 1977. Exchange and power in networks of interorganizational relations. *Sociological Quarterly,* 18: 62–82.

Cook, K., & Emerson, R. 1978. Power, equity, and commitment in exchange networks. *American Sociological Review,* 43: 721–739.

Danos, P., & Eichenseher, J. W. 1982. Audit industry dynamics: Factors affecting changes in client-industry market shares. *Journal of Accounting Research,* 20: 604–616.

Dopuch, N., & Simunic, D. 1980. The nature of competition in the auditing profession: A descriptive and normative view. In J. W. Buckley & J. F. Weston (Eds.), *Regulation in the accounting profession:* 77–94. Belmont, CA: Lifetime Learning Publications.

Eichenseher, J. W., & Danos, P. 1981. The analysis of industry-specific auditor concentration: Towards an explanatory model. *Accounting Review,* 56: 479–492.

Eichenseher, J. W., & Shields, D. 1983. The correlates of CPA-firm change for publicly-held corporations. *Auditing: A journal of practice and theory,* 2(2): 23–37.

Elliott, R. K., & Korpi, A. R. 1978. Factors affecting audit fees. In M. F. Shakun (Ed.), *Cost-benefit analysis of auditing:* 17–22. New York: American Institute of Certified Public Accountants.

Emerson, R. 1962. Power dependence relations. *American Sociological Review,* 27: 31–41.

Emerson, R. M. 1972. Exchange theory, part II: Exchange relations and network structures. In J. Berger, M. Zelditch, & B. Anderson (Eds.), *Sociological theories in progress:* 58–87. Boston: Houghton Mifflin.

Emerson, R. M. 1976. Social exchange theory. In A. Inkeles, J. Coleman, & N. Smelser (Eds.), *Annual review of sociology,* vol. 2: 335–362. Palo Alto, CA: Annual Reviews.

Fichman, M., & Levinthal, D. A. 1991a. Honeymoons and the liability of adolescence: A new perspective on duration dependence in social and organizational relationships. *Academy of Management Review,* 16: 442–460.

Fichman, M., & Levinthal, D. A. 1991b. History dependence in professional relationships: Ties that bind. In S. B. Bacharach, S. Barley, & P. S. Tolbert (Eds.), *Research in the sociology of organizations:* 119–153. Greenwich, CT: JAI Press.

Fienberg, S. E. 1980. *The analysis of cross-classified categorical data* (2d ed.). Cambridge, MA: MIT Press.

Fox, J. 1987. Effect displays for generalized linear models. In C. C. Clogg (Ed.), *Sociological methodology 1987:* 347–361. Washington, DC: American Sociological Association.

Galaskiewicz, J. 1985. Interorganizational relations. In R. H. Turner (Ed.), *Annual review of sociology,* vol. 11: 281–304. Palo Alto, CA: Annual Reviews.

Granovetter, M. 1973. The strength of weak ties. *American Journal of Sociology,* 78: 1360–1380.

Granovetter, M. 1985. Economic action and social structure: The problem of embeddedness. *American Journal of Sociology,* 91: 481–510.

Guadagni, P. M., & Little, J. D. C. 1983. A logit model of brand choice calibrated on scanner data. *Marketing Science,* 2: 203–238.

Hambrick, D. C., & D'Aveni, R. A. 1988. Large corporate failures as downward spirals. *Administrative Science Quarterly,* 33: 1–23.

Harrigan, K. 1987. *Strategic alliances: Form, autonomy, and performance.* Working paper, Graduate School of Business, Columbia University, New York.

Harris, S. P. 1976–1984. *Who audits America.* Menlo Park, CA: Data Financial Press.

Hartigan, J. A. 1975. *Clustering algorithms.* New York: Wiley.

Hauck, J. R., & Donner, A. 1977. Wald's test as applied to hypotheses in logit analysis. *Journal of the American Statistical Association,* 72: 851–853.

Hauser, J. R. 1978. Testing the accuracy, usefulness, and significance of probabilistic choice models: An information-theoretic approach. *Operations Research:* 26: 406–421.

Heide, J. B., & Miner, A. S. 1990. *The shadow of the future: The effects of the anticipated interaction and frequency of delivery on buyer-seller cooperation.* Working paper, Weatherhead School of Management, Case Western Reserve University, Cleveland.

Hirschman, A. O. 1970. *Exit, voice, and loyalty.* Cambridge, MA: Harvard University Press.

Hladik, K. 1985. *International joint ventures.* Lexington, MA: Lexington Books.

Johnson, W. B., & Lys, T. 1985. *The market for audit services: Evidence from voluntary auditor changes.* Working paper, Kellogg Graduate School of Management, Northwestern University, Evanston, IL.

Joskow, P. 1987. Contract duration and relation-specific investments. *American Economic Review,* 77: 168–185.

Kosnik, R. D. 1987. Greenmail: A study of board performance in corporate governance. *Administrative Science Quarterly,* 32: 675–687.

Levinthal, D. A., & Fichman, M. 1988. Dynamics of interorganizational attachments: Auditor-client relations. *Administrative Science Quarterly,* 33: 345–369.

Macaulay, S. 1963. Non-contractual relations in business. *American Sociological Review,* 28: 55–70.

Macchiaverna, P. R. 1981. *Corporations and their outside auditors: A changing relationship.* New York: Conference Board.

McConnell, D. K. 1984. Are the Big 8 increasing their share of the NYSE, AMEX, and OTC audit markets? *Journal of Accounting, Auditing and Finance,* 7: 178–181.

Mangold, N. R. 1987. *The effect of auditor changes on earnings, auditor's opinions, and stock prices.* Working paper, California State University, Hayward.

Mautz, R. K., & Neumann, F. L. 1977. *Corporate audit committees: Policies and practices.* Cleveland: Ernst & Ernst.

Moody's Investor Service, 1909–1986. *Moody's industrial manual.* New York: Moody's Investor Service.

Moody's Investor Service. 1976–1986. *Moody's otc industrial manual.* New York: Moody's Investor Service.

Moody's Investor Service. 1929–1986. *Moody's transportation manual.* New York: Moody's Investor Service.

Palepu, K. G. 1986. Predicting takeover targets: A methodological and empirical analysis. *Journal of Accounting and Economics,* 8: 3–35.

Palmrose, Z. 1986. Audit fees and auditor size: Further evidence. *Journal of Accounting Research,* 24: 97–110.

Pfeffer, J., & Salancik, G. R. 1978. *The external control of organizations.* New York: Harper & Row.

Pisano, G. P. 1989. Using equity participation to support exchange: Evidence from the biotechnology industry. *Journal of Law, Economics, and Organization,* 5: 109–126.

Powell, W. W. 1990. Neither markets nor hierarchy: Network forms of organization. In B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior,* vol. 12: 295–336. Greenwich, CT: JAI Press.

Standard & Poor's Corporation. 1984. *COMPUSTAT, 1983.* Engelwood, CO: Standard & Poor's Corporation.

Standard & Poor's Corporation. 1928–1983. *Standard & Poor's register of corporations, directors, and executives.* New York: Standard & Poor's Corporation.

Salancik, G. 1977. Commitment and the control of organizational behavior and belief. In B. M. Staw & G. R. Salancik (Eds.), *New directions in organizational behavior:* 1–54. Chicago: St. Clair Press.

Schlesselman, J. J. 1982. *Case-control studies: Design, conduct, analysis.* New York: Oxford University Press.

Schwartz, K. B., & Menon, K. 1985. Auditor switches by failing firms. *Accounting Review,* 60: 248–261.

Simunic, D. A. 1980. The pricing of audit services: Theory and evidence. *Journal of Accounting Research,* 18: 161–190.

Simunic, D. A. 1984. Auditing, consulting, and auditor independence. *Journal of Accounting Research:* 22: 679–702.

Staw, B. M. 1982. Counterforces to change. In P. S. Goodman (Ed.), *Change in organizations:* 87–121. San Francisco: Jossey-Bass.

Stevens, M. 1985. *The accounting wars.* New York: Macmillan.

Van de Ven, A. H. 1976. On the nature, formation, and maintenance of relations among organizations. *Academy of Management Review,* 1(4): 24–36.

Van de Ven, A. H., & Walker, G. 1984. The dynamics of interorganizational coordination. *Administrative Science Quarterly,* 29: 598–621.

Williamson, O. E. 1975. *Markets and hierarchies: Analysis and antitrust implications.* New York: Free Press.

Williamson, O. E. 1979. Transaction-cost economics: The governance of contractual relations. *Journal of Law and Economics,* 22: 233–262.

Williamson, O. E. 1981. The economics of organization: The transaction cost approach. *American Journal of Sociology,* 87: 548–577.

Williamson, O. E., & Ouchi, W. G. 1981. The markets and hierarchies program of research: Origins, implications and prospects. In A. H. Van de Ven & W. F. Joyce (Eds.), *Perspectives on organizational design and behavior:* 347–370: New York: Wiley.

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EMPLOYMENT DISCRIMINATION: AN ORGANIZATIONAL MODEL

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Empirical findings have indicated that gender-based discrimination is manifested during the assignment of workers to organizational positions. Since the position occupied has a major effect on a worker's salary, discriminatory processes in assigning positions should be incorporated into a salary discrimination model. Organizational variables were more important than individual variables in explaining both legitimate salary differentials between the men and women studied and gender-based salary discrimination.

Numerous studies have concluded that women are discriminated against in the labor market: they receive lower wages than men with equal skills and attributes. Cain (1986) summarizes these studies, most of which have split the total, or observed, wage differential between men and women into two portions: the "legitimate" portion resulting from differences in characteristics known to affect worker's productivity, and the "illegitimate" portion resulting from gender-based wage discrimination. Researchers have estimated the effect of the discriminatory component by subtracting the legitimate portion from the total observed wage differential.

This model, however, is seriously flawed. In estimating the two portions, most studies have focused on individual characteristics, such as education and labor market experience, while holding constant organizational characteristics that may also determine wages—such as job, hierarchical position, and departmental location—or ignoring them completely. The assignment of workers to organizational positions, however, may also be subject to discriminatory practices. If that is the case, holding organizational characteristics constant by comparing men and women who hold similar organizational positions cannot allow researchers to capture the wage impact of discrimination that occurs when people are assigned to those positions. In other words, conventional models may significantly underestimate the full extent of wage discrimination against women.

CONCEPTUAL FRAMEWORK

During the last decade, organizational analysis has proved indispensable for revealing dimensions of gender inequality, most notably, job segre-

gation, or the division of jobs into men's and women's categories (e.g., Blau, 1977). Taking into account that men and women work not only in different occupations, but also under different job titles within organizations, Bielby and Baron (1986) demonstrated that the extent of gender-based job segregation in nearly 300 California organizations was much more pervasive than previous research focusing on occupations only had suggested. Furthermore, men and women not only hold different job titles in organizations, but also occupy different hierarchical positions, with men dominating the managerial and supervisory ranks and women concentrated in the lower organizational ranks (Wolf & Fligstein, 1979a,b).

Yet investigators have rarely taken the implications of such findings for research on gender-based salary differentials into account. To the extent that organizational variables have been included in models of wage discrimination, they have been treated as control variables. Another stream of research was triggered by the "comparable worth" literature. A situation of comparable worth occurs when two or more different jobs are equivalent in value to an employer. Advocates of comparable worth argue that in such situations the jobs should be paid equally. Recent work on comparable worth has attempted to study the effects of organizational variables on gender-based employment segregation (e.g., Hartmann, 1987; Roos, 1981) but has not integrated segregation practices and the salary determination process into a single model of employment discrimination. The few studies that have included organizational variables have treated them as given and labeled as discrimination only that portion of the observed wage gap between men and women not due to their different individual characteristics *and* organizational positions. For instance, if men and women with equal education, experience, and other relevant individual characteristics hold different jobs within an organization, and as a result receive unequal wages, such studies would conclude that the wage differential between the two groups is the result not of discrimination but rather of their having different job titles. Thus, the wage differences between people holding different organizational positions are linked to the legitimate portion of the wage differential between men and women.

To be sure, for wage determination the characteristics of an individual's position in an organization are no less important than the person's own "human capital" (cf. Baron, 1984: 57–59). Organizational positions in large organizations are often determined by a set of bureaucratic rules and not by labor market forces of supply and demand. In such organizations, which are called "internal labor markets," an employee's job assignment, organizational tenure, hierarchical level, and organizational location are the direct outcome of managerial decisions. Job assignments determine wage grade ladders and associated working conditions. Organizational location, or position in a unit such as a division or a department, may affect a worker's exposure to organizational rewards and career opportunities. Those who work close to a company's headquarters, for example, may enjoy better working conditions than those employed in peripheral divisions simply because the former

have more information regarding organizational policies and better access to rewards and opportunities. Likewise, access to high-level positions is deter- mined by promotion processes, which are probably the major avenue through which organizations affect earnings inequality, since they create formally stratified social structures (Scott, 1987; Simon, 1957). Organiza- tional rank also constitutes a significant resource in the process of accumu- lating power, money, and prestige. The mechanisms by which promotion opportunities are distributed are part of an organization's human resources management practices (Baron, 1984; Granovetter, 1981).

Thus, an accurate estimation of wage discrimination must take into account (1) the extent to which the managerial process of assigning people to organizational positions is discriminatory and (2) the effect of such discrim- inatory practices on wages. Regarding the first question, previous research in various organizational settings has suggested that organizational hiring and promotion policies favor men over women (e.g., Baron, 1984; Cannings, 1988; Kanter, 1977).[1] Hence,

> *Hypothesis 1a: Organizations discriminate against women when assigning people to high-level positions.*
>
> *Hypothesis 1b: Unmasking organizational discrimination in assigning positions will increase the proportion of the overall wage gap between men and women accounted for by gender-based wage discrimination.*

The next question is whether more discrimination is associated with organizational or with individual attributes. The organizational component consists of discrimination occurring when companies assign positions and evaluate them. Such evaluations can result in differential pay for men and women in similar positions. The individual component consists of pay- ing women less than men for individual attributes. There are reasons to believe that discrimination associated with organizational attributes is more prevalent than that associated with individual attributes. Because they face an environment hostile to discrimination, it is increasingly unacceptable for large organizations to pay different wages to men and women holding iden- tical positions, especially if those workers have similar individual charac- teristics. In such cases it would be relatively easy to prove that the organ- izations indeed engaged in discriminatory practices. In contrast, organiza- tional discrimination in assigning positions is more difficult to unmask and challenge. Assigning men and women of similar characteristics to different

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[1] Research results in this area have been, however, inconclusive. On the one hand, Olson and Becker (1983) suggested that women often must satisfy higher standards than men to gain promotion and Cannings (1988) obtained similar results. On the other hand, several firm-level analyses have found that women enjoyed better promotion opportunities than men (Hartmann, 1987; Lewis, 1986; Stewart & Gudykunst, 1982; Tsui & Gutek, 1984). But when these differences are adjusted for levels of human capital and job characteristics, women lose their promotion advantage.

positions associated with wide wage differentials may play a major role in creating the observed gender-based wage gap. Thus,

> *Hypothesis 2: Organizational variables account for a larger portion of the discriminatory component of the total wage gap between men and women than individual variables.*

To be sure, the process of assigning men and women to different jobs, ranks, and departments is not completely discriminatory and is legitimate when it stems from differences in relevant individual characteristics. We also know that wages in large organizations, and particularly in those operating as internal labor markets, are determined more by the characteristics of a position than by individual characteristics. Hence, the nondiscriminatory dimensions by which workers are assigned to various organizational positions should have a major impact on wages.

> *Hypothesis 3: Organizational variables primarily explain the legitimate portion of the wage gap between men and women.*

Testing these hypotheses required a model integrating organizational processes into the widely used labor market model of wage discrimination. Such a model must not assume that the existing division of jobs and positions between men and women is a given. Rather, it should be designed to reveal discriminatory processes that regulate the attainment of jobs and positions. However, before I present such a model, a technical discussion of the conventional labor market model and its shortcomings for estimating the organizational component of gender-based wage discrimination is needed.

MODELS OF GENDER-BASED DISCRIMINATION

The Conventional Model

The conventional wage discrimination model can be given as

$$y = \alpha p + \beta z + e, \tag{1}$$

where

y = wages,
p = productivity,
α = productivity's coefficient,
z = gender,
β = gender's coefficient,

and

e = an error term.

In this model, wage discrimination against women is present if z is coded as 1 = male, 0 = female, and the gender coefficient is positive, or when men

receive an unexplained wage premium over women with productivity differences controlled.

Most researchers engaged in empirical research aimed at estimating gender discrimination have in fact studied the following relationship:

$$y = aq + bz + u, \qquad (2)$$

where

q = estimated productivity,
a = estimated productivity's coefficient,
b = gender's coefficient,

and

u = an error term.

Since systematic performance scores (p) are generally unobtainable, researchers are forced to use human capital proxies of productivity instead (q). While admittedly crude, this is a well-established practice in sociological and economic research; a replaces α in the empirical investigations, and b, the gender coefficient, provides an estimate of β. The fact that human capital variables are an imperfect predictor of actual productivity might bias the estimate of salary discrimination (b). However, the direction and magnitude of such bias depend on much that is beyond the scope of this research. Goldberger (1984) extensively discussed this issue. It should also be noted that wage discrimination studies have generally estimated separate equations for men and women. Appendix A provides the method for deriving estimated salary discrimination when two separate equations are used.

As discussed at the outset of this paper, a major weakness of the conventional model is that it compares the wages paid to men and women possessing similar attributes and holding similar positions. Since acquisition of attributes and positions may itself reflect discrimination, holding them constant (q in Equation 2) may yield biased estimates for wage discrimination.

Some economists have noted these biases. Blau and Ferber (1987) for example, referred to the possibility that salary discrimination may affect women's decisions not to acquire salary-related attributes since their returns on such attributes are low. They called such a possibility a "feedback effect" and concluded by stating that "estimation of feedback effects is an extremely important area which has been neglected in previous work" (1987: 320). Bayer and Astin (1975) and Hoffman (1976) were aware of the possibility that rank itself may reflect discrimination and chose to omit rank from a group of individual determinants of scientists' salaries. As expected, their estimates of salary discrimination against women were larger than those obtained with rank included among the salary determinants. Omitting rank might be better than simply controlling for gender differences in rank because it points at possible discriminatory treatment in promotion. However, omission of salary-related variables results in model misspecification and

cannot be recommended as a way for solving the problem of controlling variables that contain discrimination.

The Organizational Model

My proposed model integrates discriminatory processes associated with organizational wage determinants, such as position in an organizational hierarchy, into the wage discrimination model. This model has two steps. First, it estimates gender-based discrimination in the acquisition of organizational rank:

$$r = C' T + dz + v, \qquad (3)$$

where

 r = organizational rank,
 T = a vector of rank determinants,
 C = a vector of their coefficients,
 d = discriminatory practices against women seeking to enter certain organizational levels,

and

 v = an error term.

In terms of my first hypothesis, I expected d to be positive: ceteris paribus, men are more likely than women to attain high ranks.

In this model's second step, rank (Equation 3) is replaced with a variable indicating expected organizational rank and based on the assumption that the process of acquiring organizational rank is free of discrimination. I first estimated the rank acquisition of men. An estimate of rank acquisition free of gender-based discrimination could then be calculated for an entire population by applying the coefficients derived for men to both men and women. The predicted rank represents the rank of each individual if male and female employees would have been promoted according to the same rules—the rules by which men are promoted.

$$y = q^* + g(\hat{r}) + bz + u, \qquad (4)$$

where

 q^* = productivity, not including rank,
 $\hat{r}$ = predicted rank calculated for each worker on the basis of the rank coefficients for men,

and

 g = the effect of rank acquired in the absence of discrimination on wages.

In terms of the second hypothesis, I expected the wage discrimination estimate (b) derived from the new model (Equation 4) to be larger than the estimate derived from the conventional model (Equation 2). Likewise, I expected the new model to enable testing Hypotheses 2 and 3 by comparing the contribution of organizational and individual attributes to b and q^*. This can be accomplished by decomposing each one of the wage gaps—legitimate

and discriminatory—into two portions: one resulted from organizational (internal) factors and the other from individual (external) factors.

METHODS

Setting and Data

Testing the model specified in Equation 4 required detailed data on individual and organizational characteristics of workers in one or more large firms. I obtained such data during 1987 from a large Israeli corporation specializing in advanced telecommunication technology and diagnostic systems and encompassing the entire production process—research, development, planning, and manufacturing. Accordingly, the corporation employs an extremely heterogeneous work force comprising engineers, professionals, technical workers, clerks, production workers, and support staff. Using data obtained from an Israeli rather than an American firm should not limit the analysis because the processes of gender-based employment discrimination operating in the Israeli labor market are similar to those operating in the United States (Izraeli & Gaier, 1979; Semyonov & Kraus, 1983).

The firm operates seven different functional divisions located in the central part of the country. Some 21 percent of its 5,087 employees are women. The head office employs 9 percent of the corporate work force, and half of those people are women. Data were obtained from the organization's personnel files, and records of all workers employed by this corporation were used in the analysis.

The corporation studied operates as an internal labor market. Workers are organized into five distinct job clusters (Dunlop, 1957), each a separate domain within which an employee may be upgraded, transferred, or laid-off (Doeringer, 1967). In this firm, 33 percent of the work force is employed in research and engineering jobs, 12 percent in support jobs (e.g., personnel, clerical), 25 percent in technical jobs, 27 percent in production, and 3 percent in other professional jobs (e.g., law, accounting).

Mobility across clusters is extremely low, partially because the skills and training required in each cluster differ and partially because each has a separate collective contract. All workers in each cluster are represented by a union, and most of the bargaining revolves around salaries, benefits, and work rules. Workers are assigned to clusters mainly at the hiring stage, with assignments made according to individuals' qualifications, training, and previous occupations.

Each cluster has from 10 to 15 wage grades along which employees progress according to seniority, education, and general performance evaluations made by their superiors. In addition, the firm's managerial ladder is open (at least formally) to all employees irrespective of the job cluster to which they belong. Promotion to managerial positions is company-wide and does not take place separately within each cluster. As a result, promotions are not subject to the collective bargaining process and are left to managerial discretion.

Thus, workers belonging to different clusters can occupy identical managerial levels. The managerial ladder consists of five levels ranging from group head up to division head. All managers are recruited from within the company, and new managers almost invariably begin at the first level. Promotion along the hierarchical ladder is based on managerial discretion and on company rules, such as contribution to the firm.

The total salary of each employee is thus a function of organizational and individual variables. The main organizational attributes are seniority and the job cluster and hierarchical level in which a worker is situated. The main individual attributes are education and performance, which is measured by general, informal evaluations by superiors.[2] The combination of seniority, education, and performance appraisal determines the wage grade within a cluster in which a worker is situated. Thus, employees can obtain pay increases within job clusters and organizational ranks by moving along the wage grades associated with each cluster on the basis of their individual characteristics.

Variables

Table 1 presents descriptive statistics for the variables used in the study for all the company's employees and for men and women separately. Appendix B gives operational definitions of the variables. The table includes data on the dependent variable, total monthly salary, and on two groups of independent variables. The first group comprises individual variables, or external labor market variables, including the human capital variables: age, a proxy for labor market experience; age squared, for detecting change in a positive relationship between age and salary beyond a certain age; and a set of four dummy variables indicating educational level, with the high school level serving as the omitted category to which all the other educational categories are compared. Gender, marital status, and number of children are also included in the individual variables.

The second group consists of organizational, or internal labor market, variables and includes tenure in the organization, a major determinant of rewards in companies operating as internal labor markets; a set of dummy variables indicating five hierarchical levels, with nonmanagers as the omitted category to which all the other five categories are compared; a set of six dummy variables for organizational divisions, with the headquarters division as the omitted category; and another set of four dummy variables for job clusters: service, clerical and support jobs; research and engineering; tech-

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[2] This firm did not systematically report performance appraisals. The unavailability of performance information could be a major problem in the study of promotion processes since small differences in performance may result in significant differences in rank attained. To the extent that the portions of performance its proxies do not capture covary with gender, the absence of performance ratings could bias the results of this study. However, I have no evidence that such covariance occurs.

TABLE 1

Means and Standard Deviations

Variables	All Workers		Men		Women	
	Means	s.d.	Means	s.d.	Means	s.d.
Wages	1,528.1	540.3	1,652.0	501.4	1,071.1	419.7
Gender	0.79	0.41				
Marital status	0.91	0.28	0.93	0.25	0.84	0.36
Children	1.8	1.1	1.9	1.1	1.7	1.1
Age	38.3	8.0	39.2	0.0	34.8	6.7
Age squared	1,528.9	680.8	1,603.8	699.2	1,252.6	522.7
Post—high school	0.28	0.45	0.31	0.46	0.17	0.38
B.A.	0.22	0.42	0.23	0.42	0.18	0.38
M.A.	0.09	0.29	0.10	0.30	0.05	0.23
Ph.D.	0.06	0.23	0.07	0.25	0.02	0.13
Tenure	10.4	6.5	10.9	6.8	8.4	4.5
Full-time	99.8	2.7	99.9	2.0	99.3	4.4
Level 1	0.16	0.36	0.17	0.37	0.11	0.31
Level 2	0.10	0.30	0.12	0.33	0.03	0.17
Level 3	0.03	0.17	0.04	0.19	0.01	0.03
Level 4	0.002	0.14	0.002	0.16	0	0
Level 5	0.004	0.06	0.005	0.07	0	0
Rank	1.5	1.0	1.6	1.0	1.2	0.5
Division 1	0.16	0.36	0.17	0.37	0.12	0.32
Division 2	0.12	0.33	0.13	0.33	0.10	0.30
Division 3	0.16	0.37	0.18	0.38	0.09	0.29
Division 4	0.17	0.38	0.17	0.37	0.18	0.38
Division 5	0.10	0.29	0.09	0.29	0.12	0.33
Division 6	0.20	0.40	0.20	0.40	0.19	0.39
Job cluster 1	0.12	0.32	0.04	0.20	0.39	0.49
Job cluster 2	0.33	0.47	0.38	0.49	0.14	0.35
Job cluster 3	0.25	0.43	0.27	0.44	0.19	0.39
Job cluster 4	0.27	0.44	0.29	0.45	0.20	0.40
N	5,087		4,002		1,085	

nical; and production jobs. The omitted job cluster is professional jobs. The first job cluster includes mainly jobs typically filled by women, such as clerical jobs; the second cluster has more "men's" than "women's" jobs, mainly engineering and research jobs; and the other groups are mixed as far as gender-type is concerned.

Two final variables are a continuous measure of hierarchical level (rank) and a measure of working hours.

Estimation Models

Ordinary-least-squares and two-stage least squares regression analyses were used to estimate the various models in this study. For each model, I estimated the discrimination level twice, once for all employees, with gender included in the equation, and once for men and women separately. I then decomposed the observed gap into an explained portion and an unexplained, or discriminatory, portion. Three empirical models were estimated, corresponding to Equations 2, 3, and 4.

First, I studied a salary model in which the dependent variable examined was monthly salary. One equation included only individual-level determinants, a second only organizational determinants, and the third, both groups of salary determinants (see Equation 2). This was done in order to estimate the contribution of within-organization and individual factors to both the explained and unexplained portions of the gender-based salary gap as estimated by the conventional model.

In the second estimated model, hierarchical rank served as the dependent variable. The purpose of this estimation procedure was twofold. First, I tested Hypothesis 1a to determine the extent of discrimination involved in the process of placing employees in managerial positions (Equation 3). Second, I used results obtained with the rank equation for men to calculate a predicted rank value for the women employed in the firm.

The third model examines the effect of hierarchical level on salary while taking into consideration discriminatory processes affecting promotion to high levels (Equation 4) by including the predicted rank value for women. This model allowed tests of Hypotheses 1b, 2, and 3.

Two explanatory comments are necessary here. First, the equation for rank includes all the independent variables presented in the full equation for wages, plus a set of dummy variables representing the organizational divisions to which employees belong. A division in the corporation under study is practically an "establishment" (Granovetter, 1984), a plant in which hiring, promotion, and firing decisions are made autonomously. I included this variable in the rank equation owing to its special importance for the two major organizational processes under study, wage determination and promotion.

The company's divisions not only had different promotion practices but also different sizes. Researchers have found that establishment size is associated with promotion opportunities (Baron, 1984; Rosenbaum, 1979) and with attributes of organizations and industries (Baron, 1984; Kimberly, 1976;

Villemez & Bridges, 1988). Moreover, establishment size may mediate the relationship between human capital variables and promotion processes (Stolzenberg, 1978). Salary practices, on the other hand, which are rooted in labor contracts, were hypothesized to be uniform within job clusters and invariant across divisions.

Second, attention should be drawn to differences between labor contracts in the United States and Israel. Whereas an American contract in a multiplant company is often concluded at a plant level, an Israeli agreement is company-wide and is worked out separately for each job cluster. As a result, uniform wage agreements are made within job clusters, irrespective of organizational divisions. Thus, both the rank and wages equations may be seen as estimates of a single model in which rank is estimated initially,[3] organizational divisions serve as instruments in identifying the equation, and the predicted value of an employee's hierarchical level is derived from using the rank equation of men for calculating rank of both gender groups. These predicted values replace the actual organizational positions in the second step, when a new wages equation is estimated.

RESULTS

Hypothesis 1a predicts gender-based discrimination in the determination of rank. Table 2 shows results of the regression analysis testing this hypothesis. It reveals a coefficient of 0.3 for gender, representing the advantage that men enjoy over women in the attainment of high ranks due not to the men's individual characteristics but merely to their gender. Since the overall gap in rank between men and women is 0.4 (Table 1), it appears that a full three-quarters of the observed gap between the two groups in organizational rank is due to discrimination. The remaining hypotheses deal with the implications of such organizational discrimination in assignment to positions for wage discrimination. Table 3 summarizes the relevant results of the regression analyses presented in Tables 2, 4, and 5. The total observed wage gap between men and women in the organization is $580.90.[4] Results based on the conventional wage model, which ignores discrimination in rank, suggest that 68 percent of this gap is legitimate and 32 percent is discriminatory (Appendix A explains how these figures were calculated). In contrast, results using the integrated organizational discrimination model, which takes into account prior discrimination in rank, indicate that 36 percent of the gap is discriminatory and only 64 is legitimate. These results

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[3] To examine whether the use of dummy variables rather than a continuous organization-level variable affected results, I estimated an additional equation for wages, substituting the rank variable for the five level variables and estimating separate equations for all workers, men, and women. The signs, magnitudes, and standard errors of the coefficients in these equations were almost identical to those presented in Table 4. The difference between the two gender coefficients estimated in the whole-group equations was less than 2 percent.

[4] The results of t-tests for differences in means between men's and women's averages on the dependent variables were significant: for wages, $t = 38.7$, and for rank, $t = 15.0$.

TABLE 2
Results of Regression Analysis for Rank[a]

Variables	All Workers		Men		Women	
	b	*t*	*b*	*t*	*b*	*t*
Age	0.03	2.08	−0.01	−0.30	0.02	0.14
Age squared	−0.001	−2.07	0.00	0.28	0.00	0.31
Post–high school	0.07	1.74	0.06	1.41	0.03	1.90
B.A.	0.31	4.30	0.07	0.84	0.10	1.48
M.A.	0.58	7.27	0.36	3.75	0.16	1.63
Ph.D.	0.84	9.64	0.56	5.51	0.19	1.42
Marital status	0.12	2.68	0.05	0.97	0.14	2.94
Children	0.02	1.67	0.05	3.98	−0.02	−1.12
Tenure	0.04	17.44	0.04	16.48	0.02	5.48
Job cluster 1	−0.55	−5.20	−0.93	−6.64	−0.65	−7.86
Job cluster 2	0.34	−4.80	−0.38	−4.03	−0.58	−8.66
Job cluster 3	−0.75	−7.30	−1.10	−8.68	−0.86	−9.66
Job cluster 4	−0.80	−7.64	−1.17	−9.17	−0.82	−9.29
Full-time	0.01	1.42	0.01	0.89	0.01	2.86
Division 1	−0.50	−10.53	−0.91	−14.73	0.01	0.17
Division 2	−0.37	−7.65	−0.80	−12.52	0.02	0.40
Division 3	−0.46	−10.08	−0.84	−12.72	−0.04	−0.75
Division 4	−0.41	−8.94	−0.81	−13.13	0.05	1.10
Division 5	−0.30	−5.65	−0.62	−9.10	-0.06	−1.23
Division 6	−0.38	−8.35	−0.76	−12.94	0.02	0.47
Gender	0.30	9.10				
Constant	−0.36	−0.69	−1.95	−2.69	0.64	1.39
N	5,087		4,002		1,085	
R²	0.34		0.36		0.23	

[a] The results of *t*-tests are provided for readers who wish to make inferences to other organizations. These ratios were not used for hypothesis testing in the studied firm since data were gathered from all workers.

support Hypothesis 1b. It should be emphasized that a 4 percent increase in estimated discrimination is trivial neither statistically nor practically. The statistical importance of such an increase can be estimated with a test for the significance of the difference between the gender coefficients obtained in the whole-group full equation containing actual level (third column in Table 4) and the whole-group equation containing predicted level (first column in Table 5). This test yields a *t* of 2.15. Practically, an increase of 4 percent in the discriminatory portion of the gap constitutes a 12.5 percent increase (4/32), translated into $272 per year.

Hypotheses 2 and 3 predict that organizational rather than individual attributes will account for more of both the discriminatory and legitimate portions of the wage gap. Results again support the hypotheses. From examining Table 3 it can be seen that the legitimate portion of the total wage gap is 64 percent of the total, or $371.22 (right column, top panel). Of this amount, $292.80 is due to differences between men and women in the organizational variables (rank, job cluster, tenure, full-time status), and only

TABLE 3
Decomposition Results

Variables	Conventional Wage Model		Integrated Model	
	Value	Percentage	Value	Percentage
Observed wage gap	$580.90	100	$580.90	100
Total legitimate gap	$393.90	68	$371.22	64
Organizational	$291.33	50	$292.80	50
Individual	$102.57	18	$78.42	14
Total discriminatory gap	$187.03	32	$209.70	36
Different constant terms	−$518.50	−89	−$373.50	−64
Different organizational coefficients	$233.70	40	$490.60	84
Different individual coefficients	$471.83	81	$92.60	16

$78.42 is the result of differences in their individual characteristics[5] (age,[6] education, marital status, and having children).

Organizational variables also account for much of the $209.70 representing the discriminatory portion of the wage gap (right column, at the bottom).[7] The dollar value resulting from organizational discrimination in assigning women and men to different positions and in the returns from positions is five times the value resulting from discrimination based on individual characteristics ($490.60 vs. $92.60).

As the bottom panel of the left column of Table 3 shows, these results differ from results based on the conventional wage discrimination model with organizational position held constant. In such models, the dollar value of discrimination in returns to organizational position is only about half the

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[5] Tenure and job cluster 1 are the major organizational variables explaining the gender salary gap in the corporation studied. The men had, on the average, longer company tenures than the women. This is a key difference in a firm operating as an internal labor market because tenure is highly rewarded in such markets. Few men were in cluster 1, containing clerical and support jobs: 4 percent, compared to 39 percent of the women. Since these are low-paying jobs, this large difference explains a substantial portion of the salary gap between the two gender groups.

[6] Among the workers studied, the men were on the average older than the women (39.2 years of age vs. 34.8) and thus entitled to higher salaries. But they also enjoyed higher returns for each additional year of age than the women ($63.81 vs. $48.06), a difference that contributes significantly to the estimated discriminatory wage gap. The difference between the returns obtained by men and women for each year of age could be due to the use of age as a proxy for labor market experience. Assuming that women's labor market careers are often interrupted, a situation in which men and women enjoy similar returns for each additional year of market experience would be reflected in a lower estimated *age* coefficient for the women.

[7] However, this portion of the gap cannot be attributed to the internal and external variables only, as can the legitimate gap. The discriminatory portion contains a third component, the difference in the intercepts of the equations calculated for men and women, which is impossible to attribute to a specific group of variables.

TABLE 4
Results of Regression Analyses for Wages[a]

Variables	All Workers[b]			Men			Women		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Age	111.67		58.15	122.75		63.81	91.84		48.06
	(19.57)		(10.11)	(17.77)		(9.85)	(7.89)		(5.13)
Age squared	-1.05		-0.57	-1.13		-0.59	-1.04		-0.54
	(-15.62)		(-8.59)	(14.16)		(-8.11)	(6.95)		(-0.68)
Post–high school	229.19		75.25	199.92		49.86	315.19		86.99
	(15.44)		(4.52)	(11.36)		(2.42)	(11.84)		(3.40)
B.A.	321.26		239.51	286.47		142.64	421.90		126.35
	(20.58)		(7.51)	(15.09)		(3.62)	(15.79)		(3.28)
M.A.	378.78		246.87	311.21		105.94	703.31		296.11
	(17.60)		(6.83)	(12.55)		(2.43)	(15.39)		(5.35)
Ph.D.	441.98		284.84	318.57		106.54	882.45		461.94
	(16.48)		(7.23)	(10.79)		(2.32)	(11.49)		(6.08)
Marital status	71.67		51.42	53.56		34.47	54.84		56.76
	(3.14)		(2.61)	(1.83)		(1.35)	(1.71)		(2.22)
Children	5.22		5.42	4.34		9.21	-1.34		-4.19
	(0.83)		(0.96)	(0.58)		(1.40)	(-0.94)		(-0.44)
Tenure		28.28	20.09		28.01	16.95		23.86	19.82
		(33.45)	(18.65)		(29.47)	(13.40)		(12.82)	(9.64)
Level 1		257.77	223.51		274.08	257.10		204.18	190.50
		(17.11)	(14.91)		(15.68)	(15.03)		(7.31)	(7.13)
Level 2		308.78	266.19		310.08	295.02		340.22	277.90
		(16.42)	(14.27)		(15.22)	(14.75)		(6.79)	(5.77)
Level 3		485.49	445.53		492.09	471.71		480.18	399.73
		(15.34)	(14.30)		(14.42)	(14.09)		(5.16)	(4.48)

TABLE 4 (continued)

Variables	All Workers[b]			Men			Women		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Level 4		635.76	591.40		639.78	613.49		713.82	668.00
		(16.64)	(15.64)		(15.98)	(15.51)		(2.63)	(2.58)
Level 5		827.91	818.52		786.68	800.21			
		(9.67)	(9.77)		(8.98)	(9.37)			
Job cluster 1		-489.58	-202.02		-486.76	407.80		-397.65	-280.99
		(-15.02)	(-4.40)		(-9.46)	(-6.57)		(-11.49)	(-5.98)
Job cluster 2		87.22	134.90		51.23	33.61		380.89	276.90
		(2.87)	(4.41)		(1.21)	(0.81)		(10.12)	(7.30)
Job cluster 3		48.20	288.29		35.66	131.11		128.43	188.80
		(1.51)	(6.49)		(0.79)	(2.31)		(3.34)	(3.73)
Job cluster 4		-79.04	206.92		-64.82	57.24		-163.74	-57.88
		(-2.47)	(4.57)		(-1.44)	(1.00)		(-4.35)	(-1.16)
Full-time		11.33	13.17		13.01	12.97		9.74	9.75
		(6.00)	(7.12)		(4.27)	(4.36)		(5.19)	(5.41)
Gender	348.07	241.49	196.81						
	(23.22)	(16.80)	(13.58)						
Constant	-1,682.18	-149.41	-1,905.51	-1,578.99	-64.94	-1,656.58	-1,029.05	-23.21	-1,138.08
	(-14.42)	(-0.79)	(-8.07)	(-11.18)	(-0.21)	(-5.14)	(-4.73)	(-0.12)	(-4.53)
N	5,087	5,087	5,087	4,002	4,002	4,002	1,085	1,085	1,085
R^2	0.43	0.56	0.58	0.28	0.43	0.45	0.41	0.60	0.64

[a] Values in parentheses are for t. A Chow test for a difference in the structures of the full equations for men and women yields an F of 10.7. This value is much larger than the critical value of $F_{19, 5047}$ = 1.9 at the 0.01 level of significance.

[b] Model 1 contains individual variables; model 2, organizational variables; and model 3, both groups of variables.

TABLE 5
Results of Regression Analyses with Predicted Rank

Variables	All Workers		Men		Women	
	b	t	b	t	b	t
Age	68.20	10.90	54.26	7.63	53.28	5.18
Age squared	−0.70	9.78	−0.50	6.38	−0.61	4.72
Post–high school	74.95	4.25	42.55	1.92	100.91	3.79
B.A.	260.46	7.45	112.58	2.59	139.22	3.43
M.A.	275.96	6.63	50.71	0.99	315.46	5.38
Ph.D.	317.91	6.82	36.82	0.66	479.49	5.92
Tenure	21.64	15.60	15.62	9.02	22.44	9.41
Marital status	66.53	3.16	30.24	1.10	76.29	2.83
Children	0.72	0.12	−12.04	1.72	−10.29	1.04
Job cluster 1	−201.81	4.08	−406.57	6.01	−359.51	6.63
Job cluster 2	122.77	3.61	52.61	1.13	202.38	4.88
Job cluster 3	266.62	5.34	159.53	2.42	80.19	1.30
Job cluster 4	181.87	3.56	84.79	1.27	−156.74	2.56
Full-time	14.36	7.35	13.24	4.19	11.11	5.94
Predicted rank[a]	102.47	4.69	214.38	7.41	18.62	0.67
Gender	241.70	15.83				
Constant	−2,346.48	9.49	−1,695.59	7.26	−1,322.09	5.04
N	5,087		4,002		1,085	
R^2	0.53		0.38		0.62	

[a] Predicted rank for men and women is derived from the equation for men (see Table 2).

value of discrimination in returns to individual characteristics. This pattern is merely an artifact associated with the conventional model; since discrimination in assignment to position is not considered, individual variables— age, in particular—dominate the model and artificially capture the effect of such discriminatory assignments on wages.

DISCUSSION

The empirical results of the study are unequivocal: integrating organizational processes into a wage determination model reveals a degree of gender-based discrimination that is higher than that estimated by previous models. Further, organizational rather than individual variables account for most of both portions of the wage differential—the discriminatory and the legitimate.

These results have a number of implications. First, labor market research should not simply control for organizational attributes. Rather, researchers should study organizational attributes explicitly, looking for possible discriminatory practices, and incorporate those variables into models dealing with employment discrimination. A necessary condition for such an examination is the availability of detailed organizational data. This study demonstrates some advantages of such an approach and suggests new possibilities for the analysis of firm-level data in the study of discrimination. Second, differential remuneration for men and women who hold different organizational positions or perform different jobs is widely accepted (cf. Treiman & Hartmann, 1981). Proponents of the comparable worth argument should, however, consider the chances of men's and women's entering various jobs if they seek to price the effect of hiring discrimination by estimating its effect on wage differentials between men and women. The same criticism may be leveled at the method of pricing jobs according to the responsibility associated with them, which ignores the barriers faced by women who seek to attain responsible positions. Investigators using a conventional model for detecting salary discrimination will identify only employers who pay different salaries to equally situated workers. They are thus in effect searching for signs of overt discrimination—employers with a smoking gun in hand. The integrated organizational model of salary discrimination proposed here is a means of identifying covert discriminatory practices. When estimates of the effects of such practices are added to those of practices that are clearly defined as discriminatory, the overall estimate of salary discrimination increases.

Two caveats are in order. First, on the basis of several studies (e.g., Shenhav, 1991), I assumed that men and women are equally motivated to get into managerial positions. Furthermore, both the conventional and the organizational models of salary discrimination are based on the assumption that all salary-related variables are incorporated in the analyses and as a result, the illegitimate portion of the salary gap can be estimated by the residual remaining after subtracting the legitimate portion from the total gap

between men and women. However, it is possible that such assumptions are false and that women are less motivated than men to become managers, or that unmeasured variables are related to both salary and gender; for instance, men might show more job commitment than women. If this is the case, the results presented above could be biased.

Second, inability to generalize conclusions to large segments of the labor force is inherent in a firm-level research design. This and other limitations discussed previously should be kept in mind when considering this study's results and conclusions. On the other hand, there is no research strategy better suited to investigating the critical contribution of work organizations to market discrimination. The proposed research strategy and employment discrimination model may be applied to any organization. The results presented here merely demonstrate the advantages to be gained from such an approach.

Future research in this area should focus on two major issues. First, the organizational model of discrimination presented here should be applied to additional organizational processes, such as the assignment of workers to jobs, departments, and divisions and the process of hiring. For example, the percentage of women in this company's work force (21 percent) is approximately half the percentage of women in the national Israeli labor market. This might be an indication of gender-based access discrimination in the studied firm. Incorporating the hiring process into the organizational model of discrimination studied here might have yielded an even larger estimate of salary discrimination against women in the company. Second, this model should be studied in various types of organizations in order to identify structural influences on its effectiveness. It is possible that the policies, structure, culture, and goals of the organization studied affected this study's results. Similar studies in other organizations will enable isolation of the variance in discrimination resulting from interorganizational characteristics.

REFERENCES

Baron, J. N. 1984. Organizational perspectives on stratification. In R. H. Turner (ed.), *Annual review of sociology*, vol. 10: 37–69. Palo Alto, CA: Annual Reviews Inc.

Bayer, A. E., & Astin, H. S. 1975. Sex differentials in the academic reward system. *Science*, 188: 796–802.

Bielby, W. T., & Baron, J. N. 1986. Men and women at work: Sex segregation and statistical discrimination. *American Journal of Sociology*, 91: 739–799.

Blau, F. D. 1977. *Equity pay in the office.* Lexington, MA: Lexington Books.

Blau, F. D., & Ferber, M. A. 1987. Discrimination: Empirical evidence from the United States. *American Economic Association Papers and Proceedings*, 77: 316–320.

Cain, G. G. 1986. The economic analysis of labor market discrimination: A survey. In O. Ashenfelter & R. Layard (Eds.), *Handbook of labor economics*, vol. 1: 693–785. New York: Elsevier Science Publishers.

Cannings, K. 1988. Managerial promotion: The effects of socialization, specialization, and gender. *Industrial and Labor Relations Review*, 42: 77–88.

Doeringer, P. B. 1967. Determinants of the structure of industrial type internal labor markets. *Industrial and Labor Relations Review,* 20: 206–220.

Dunlop, J. T. 1957. The task of contemporary wage theory. In G. W. Taylor & F. C. Pierson (Eds.), *New concepts in wage determination:* 127–139. New York: McGraw-Hill.

Goldberger, A. S. 1984. Reverse regression and salary discrimination. *Journal of Human Resources,* 19: 293–318.

Granovetter, M. S. 1981. Toward a sociological theory of income differences. In I. Berg (Ed.), *Sociological perspectives on labor markets:* 11–47. New York: Academic Press.

Granovetter, M. S. 1984. Small is beautiful: Labor markets and establishment size. *American Sociological Review,* 49: 323–334.

Hartmann, H. I. 1987. Internal labor markets and gender: A case study of promotion. In C. Brown & J. A. Pechman (Eds.), *Gender in the workplace:* 59–92. Washington, DC: Brookings Institution.

Hoffman, E. P. 1976. Faculty salaries: Is there discrimination by sex, race, and discipline? Additional evidence. *American Economic Review,* 66: 196–198.

Iams, H. M., & Thornton, A. 1975. Decomposition of differences: A cautionary note. *Sociological Methods and Research,* 3: 341–352.

Izraeli, D. N., & Gaier, K. 1979. Sex and interoccupational wage differences in Israel. *Industrial Relations,* 18: 227–232.

Kanter, R. M. 1977. *Men and women of the corporation.* New York: Basic Books.

Kimberly, J. R. 1976. Organizational size and the structuralist perspective: A review, critique, and proposal. *Administrative Science Quarterly,* 21: 571–597.

Lewis, G. B. 1986. Gender and promotions. *Journal of Human Resources,* 21: 406–419.

Oaxaca, R. 1973. Male-female wage differential in urban labor markets. *International Economic Review,* 14: 693–709.

Olson, C. A., & Becker, B. E. 1983. Sex discrimination in the promotion process. *Industrial and Labor Relations Review,* 36: 624–641.

Roos, P. A. 1981. Sex stratification in the workplace: Male-female differences in economic returns to occupation. *Social Science Research,* 10: 195–224.

Rosenbaum, J. A. 1979. Organizational career mobility: Promotion chances in a corporation during periods of growth and contraction. *American Journal of Sociology,* 85: 21–48.

Scott, W. R. 1987. *Organizational rational, natural and open systems.* Englewood Cliffs, NJ: Prentice-Hall.

Semyonov, M., & Kraus, V. 1983. Gender, ethnicity and income inequality: The Israeli experience. *International Journal of Comparative Sociology,* 24: 258–272.

Shenhav, Y. 1991. Expected managerial careers within growing and declining R&D establishments. *Work and Occupations,* 18: 46–71.

Simon, H. A. 1957. *Administrative behavior.* New York: Macmillan.

Stewart, L. P., & Gudykunst, W. B. 1982. Differential factors influencing the hierarchical level and number of promotions of males and females within an organization. *Academy of Management Journal,* 25: 586–597.

Stolzenberg, R. M. 1978. Bringing the boss back in: Employer size, employee schooling, and socioeconomic achievement. *American Sociological Review,* 43: 813–828.

Treiman, D. J., & Hartmann, H. I. (Eds.). 1981. *Women, work and wages: Equal pay for jobs of equal value.* Washington, DC: National Academy Press.

Tsui, A. S., & Gutek, B. A. 1984. A role set analysis of gender differences in performance, affective relationships, and career success of industrial middle managers. *Academy of Management Journal,* 27: 619–635.

Villemez, W. J., & Bridges, W. P. 1988. When bigger is better: Differences in individual level effect of firm size and establishment size. *American Sociological Review,* 53: 237–255.

Wolf, W. C., & Fligstein, N. D. 1979a. Sexual stratification: Differences in power in the work setting. *Social Forces,* 58: 94–107.

Wolf, W. C., & Fligstein, N. D. 1979b. Sex and authority in the workplace: The causes of sexual inequality. *American Sociological Review,* 44: 235–252.

APPENDIX A

In wage discrimination studies, wage equations are estimated separately for men and for women as follows:

$$y_m = b_{Om} + B'_m X_m \text{ and } y_w = b_{Ow} + B'_w X_w,$$

where y denotes salary, b_O is an intercept, B is a coefficients vector, X is a vector of salary determinants, and "m" and "w" denote men and women. The observed salary differential $(\bar{y}_m - \bar{y}_w)$ is decomposed (Iams and Thornton, 1975, and Oaxaca, 1973, explain this method) into (1) a legitimate portion attributable to differing levels of such salary determinants as different human capital levels or differing jobs: $B'_m (\bar{X}_m - \bar{X}_w)$, (2) a portion attributable to differing coefficients, or returns on the salary determinants: $\bar{X}'_w (B_m - B_w)$, and (3) a shift coefficient $(b_{Om} - b_{Ow})$, which is the difference between the constant terms of the two equations. Discrimination (D) is estimated by the sum of the shift coefficient and the differences between the coefficients:

$$D = (b_{Om} - b_{Ow}) + \bar{X}'_w (B_m - B_w).$$

APPENDIX B
Definitions of Variables

Wages: Total monthly salary in U.S. dollars.
Gender: 1 = man, 0 = woman.
Marital status: 1 = married, 0 = not married.
Children: Number of children.
Age: Age in years.
Age squared: Age in years squared.
Post–high school: 1 = post–high school, nonuniversity accreditation, 0 = otherwise.
B.A.: 1 = B.A. degree, 0 = otherwise.
M.A.: 1 = M.A. degree, 0 = otherwise.
Ph.D.: 1 = Ph.D. degree, 0 = otherwise.
Tenure: Length of employment in the organization in years.
Full-time: Hours worked as a percentage of full-time hours.
Level: 1 = a manager at [ ] level, 0 = otherwise.
Rank: 1 = nonmanager to 6 = highest-level manager.
Division: 1 = worker in division [ ], 0 = otherwise.
Job cluster: 1 = a job in cluster [ ], 0 = otherwise.

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RESEARCH NOTES

OUTCOMES OF FEDERAL COURT DECISIONS ON SEXUAL HARASSMENT

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This study examined the influence of nine case characteristics on the outcomes of federal court cases involving sexual harassment. Case characteristics that were related to the courts' decisions were the severity of the behavior involved, the presence of witnesses and documents, whether complainants had notified their companies of the harassment before filing charges, and whether the organizations had taken action. We compared findings to the results of a previous study involving harassment charges filed with the Equal Employment Opportunity Commission.

Relatively little is known about what influences the outcomes of sexual harassment cases. Such information would be of practical use to both potential complainants and potential defendants. It would allow potential complainants to review their cases and decide whether to file formal charges and aid organizations against whom charges have been filed in deciding whether to contest the charges or settle out of court.

Some research has begun to address this informational deficiency. An earlier study (Terpstra & Baker, 1988) examined 81 sexual harassment charges filed with the Illinois State Equal Employment Opportunity Commission (EEOC) agency over a two-year period.[1] Our analysis of the outcomes of those cases revealed that 31 percent had been settled in favor of the complainants. We also investigated potential predictors of the case outcomes. Through a review of relevant research, we identified nine case characteristics that might influence EEOC decisions. Those nine characteristics were: (1) the perceived seriousness of the harassment behavior reported, (2) the frequency of the harassment, (3) the status of the harasser, (4) the severity of the job-related consequences of the harassment, (5) whether the complainant had witnesses to support the charges, (6) whether the complainant had

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[1] In states that have adequate equal employment opportunity laws, the federal EEOC refers complaints to the state agency, called the "deferral agency."

documents to support the charges, (7) the nature of management's reasons for reported adverse employment-related consequences, (8) whether the complainant had notified management of the harassment prior to filing charges, and (9) whether the employing organization had taken investigative or remedial action when notified of the problem. We found that three case characteristics were significantly related to the EEOC decisions: The sexual harassment charges studied were more likely to have been resolved in favor of the complainant when the harassment behaviors were serious or the complainant had witnesses to support the charges or had given notice to management prior to filing formal charges.

These findings regarding sexual harassment charges resolved at the state EEOC level are potentially useful. But are they generalizable to sexual harassment cases tried in the federal court system? Several reasons might limit generalizability. Some legal scholars have noted differences between the EEOC's guidelines and the rulings of the federal courts over such issues as employer liability for the acts of employees and the importance of notice and of the loss of tangible, employment-related benefits (Cohen, 1987; Hauck & Pearce, 1987; Koen, 1990; Oglebay & Kobak, 1987; Robinson, Kirk, & Stephens, 1987; Susser & Jett, 1989; Twomey, 1990; Woods & Flynn, 1989). Thus, it may be possible that the EEOC and the courts employ or have employed different decision criteria. Another explanation for the apparent differences may be that the EEOC and the courts use the same criteria but invoke different evidentiary standards when ruling on sexual harassment cases.

An additional threat to the generalizability of our 1988 findings may be that the quality of the complainants' cases brought before state EEOC agencies may differ from that of cases brought before the federal courts. In pursuing sexual harassment cases under Title VII of the Civil Rights Act of 1964, complainants must first file with a state or local EEOC-approved deferral agency, which convenes a fact-finding conference to determine whether reasonable cause exists to believe the charges to be true. Some charges are dismissed prior to the conference's determination because complainants fail to follow through on the process or withdraw the charges. If the investigation finds no merit to a charge, the EEOC agency will dismiss it for lack of evidence and issue the charging party a "right-to-sue letter" permitting the case to be taken to court. If the state investigation finds merit to the charge, the agency will attempt to negotiate a settlement. If a settlement cannot be reached, EEOC lawyers may bring the case to the federal courts. However, the EEOC rarely litigates cases because of the expenses involved, reserving litigation for cases that promise to break new ground in legal interpretation and that the EEOC stands a good chance of winning. In most instances, the investigating agency just issues the complainant a right-to-sue letter allowing him or her to pursue the case at the court level (Ledvinka, 1982; Twomey, 1990).

The complaint process described above may result in differences in the quality of federal court and state EEOC cases. Many weak cases brought by

complainants at the state level may be withdrawn or dismissed and not pursued later at the federal level because of the low probability of the complainants' winning. Further, many strong cases brought by complainants may be settled at the state level because the defendants see that they would lose a court battle. Thus, complainants' cases that are not resolved at the EEOC level and that eventually find their way to the federal courts might have an intermediate quality: The types of offenses and the evidence are neither very strong nor very weak.

One final question regarding the generalizability of our earlier results involves the time frame of the study, which examined EEOC charges that were filed and disposed of prior to 1986. The Supreme Court handed down a ruling on a sexual harassment case in that year (*Meritor v. Vinson*, 1986), and that decision may have altered the legal landscape for sexual harassment cases. The decision lent more credibility, for example, to cases that do not involve the loss of tangible, job-related benefits. The Supreme Court ruling also cast doubt on the importance of complainants' providing notice to management prior to filing formal charges. Although earlier appellate court rulings were similar to the ruling in *Meritor v. Vinson* (e.g., *Bundy v. Jackson*, 1981), a Supreme Court ruling would be likely to have more influence on subsequent sexual harassment cases.

The purpose of the present study was to assess the generalizability of our 1988 findings involving sexual harassment to charges pursued in the federal courts. We examined federal district and appellate court cases involving sexual harassment, evaluating their outcomes and the influence of the nine case variables employed in the previous study on those outcomes. We also examined the influence of the 1986 Supreme Court decision on the relationships between the variables and outcomes.

METHODS

Data

All federal court cases involving sexual harassment reported in the legal bulletin, *Fair Employment Practices Cases* (*FEP Cases*), from 1974 to 1989 were identified and reviewed. We initially identified 297 cases that had something to do with sexual harassment and ultimately reduced that number to 133 for analytical purposes. A large number (106) of the cases were dropped because they were either wrongful discharge cases brought by individuals accused of sexual harassment or dealt solely with procedural issues without addressing the merits of the harassment allegations. We dropped 34 additional cases in which the court decisions were mixed or not clearly specified. The reduction also reflected a decision to analyze only the most recent outcome regarding a specific case, as we were attempting to predict the final outcome for the complainant. Thus, for cases in which both district and appellate court decisions were reported, we included only the appellate court decision, reducing the data set by an additional 24 cases.

Procedures

The information on the nine case variables, case dates, and case outcomes contained in *FEP Cases* was coded onto a content analysis form that was a slightly modified version of the form used in our earlier study (Terpstra & Baker, 1988). Each case was coded by two graduate assistants, one a woman and the other a man. Prior to the actual coding, the two coders independently coded 20 cases in a practice session. They then met with the first author to discuss the degree of agreement between their classifications. After each coder had coded all the remaining cases, the first author compared the two coding forms for each case and discussed cases that produced differing classifications on any variable with the two coders until a consensus was reached. To assess the reliability of the coding procedure, we computed the degree of agreement between the two coders' initial classifications; these figures are reported below.

Measures

Independent variables. Information regarding the nine case variables was coded and classified in exactly the same manner as it was in our 1988 study. Sexual assault, unwanted physical contact of a sexual nature, and sexual propositions linked to threats or promises of a change in an individual's conditions of employment constituted the class of more serious behaviors, dummy-coded 1, and sexual propositions unlinked to such threats or promises, date requests, offensive language or remarks, and unwanted nonverbal attention constituted the class of less serious behaviors, coded 0. The number of occasions harassment occurred was coded 0 for "once" and 1 for "repeatedly." The status of the harasser was coded 1 for a supervisor or superior and 0 for a co-worker. The presence of tangible adverse job-related consequences (discharge, demotion, denial of promotion, a poor evaluation, or unfair wages) was coded 1; the presence of offensive working conditions was coded 0. The presence or absence of witnesses and of documents supporting the complainants' charges were coded 1 and 0 respectively. The reasons management cited for decisions having an adverse effect on the complainants' conditions of employment were classified as either business-related (1) or non−business-related (0). Business-related reasons involved economic motives, poor performance, or violations of laws or company rules or policies. Non−business-related reasons involved attitude problems, personality conflicts, or "chemistry." Information regarding notice was coded 1 if complainants had complained to superiors or management prior to filing charges and 0 otherwise. Information on whether an organization took investigative or remedial action on being notified of alleged harassment was coded 1 for positive action on either and 0 for no action. We also coded each case as to whether it was decided prior to (0) or after (1) June 19, 1986, the date of the Supreme Court's ruling on sexual harassment (*Meritor v. Vinson*).

The degree of agreement between the two coders' classifications on the independent variables was as follows: type of behavior, 91 percent; number

of occasions, 94 percent; status of harasser, 96 percent; job-related consequences, 96 percent; witnesses, 94 percent; documents, 93 percent; management reasons, 96 percent; notice, 95 percent; organizational action, 94 percent; and case date, 99 percent.

Dependent variable. The court case judgments were classified as (1) for the complainant, (2) for the defendant, (3) partial or mixed, (4) unclear, or (5) other. We further analyzed only cases whose outcomes were classified as a judgment for either the complainant (dummy-coded as 1) or the defendant (0). The degree of agreement between the two coders' classifications of the outcomes of all of the cases was 90 percent; for the cases analyzed, the degree of agreement was 96 percent.

RESULTS

Table 1 presents the proportions and correlations associated with the independent variables. The obtained correlations indicated that little multicollinearity existed. Chi-square analyses comparing the proportions associated with the nine case variables in the current study and those obtained in our 1988 EEOC study indicated significant differences on three characteristics. In the federal court cases, complainants had proportionately fewer witnesses ($\chi^2 = 5.09$, $p < .05$), management offered more business-related reasons for their actions ($\chi^2 = 9.65$, $p < .01$), and complainants suffered fewer tangible job-related consequences ($\chi^2 = 5.11$, $p < .05$). Thus, it could be argued that the complainants' cases brought before the federal courts were weaker than the state EEOC cases. Perhaps many of the strong cases were settled at the state level and were not later pursued in the courts. In spite of this difference, 38 percent of the cases were decided in favor of the complainants in the federal courts, as compared to 31 percent of the EEOC cases studied earlier. A comparison indicated that those percentages were not significantly different ($\chi^2 = 1.09$, n.s.).

Next, we computed a logistic regression equation, entering all the main effect variables first, and then the set of two-way interactions between the case date variable and all the others. None of the two-way interaction terms were significant. Thus, the current data do not suggest that the 1986 Supreme Court decision had a significant effect on the relationship between the selected case characteristics and court decisions. Table 2 presents the results of the logistic regression analysis on the main effect variables along with the results from our EEOC study, for comparative purposes.

Five of the main effects in the current study were significant. Complainants were more likely to win their cases if the harassment was severe, witnesses and documents supported their cases, they had given notice to management prior to filing charges, and their organizations took no action. The coefficients for type of behavior, witnesses, and notice in the current study of court cases were similar to the coefficients for those variables in the 1988 study. However, a comparison of the two studies' coefficients for documents ($Z = 2.24$, $p < .02$) and organizational action ($Z = 3.56$, $p < .001$) suggested significant differences.

TABLE 1
Proportions and Correlations

Variables	Proportions[a]	1	2	3	4	5	6	7	8	9	10
1. Behavior	.40										
2. Number of occasions	.85	.06									
3. Status of harrasser	.85	.22	.02								
4. Consequences	.79	.06	.06	-.30							
5. Witnesses	.62	-.14	-.13	-.07	.07						
6. Documents	.61	-.17	.03	-.02	-.09	-.26					
7. Management reasons	.89	.19	.04	.08	-.20	-.16	.13				
8. Notice	.64	-.46	-.09	.04	-.21	.15	.14	.27			
9. Organizational action	.28	.50	.21	.09	.16	-.25	-.33	-.21	-.58		
10. Case date	.32	-.04	-.04	.01	-.13	.14	-.05	.01	.20	-.03	
11. Court decision	.38	.14	-.06	-.12	-.02	-.07	-.16	.01	-.50	.50	-.01

[a] These variables were dummy-coded, allowing their means to be interpreted as proportions. N = 133.

TABLE 2
Results of Logistic Regression Analysis of Outcomes

Variables	Federal Court Cases[a]		EEOC Cases[b]	
	Coefficients	Standard Errors	Coefficients	Standard Errors
Type of behavior	−1.98**	0.69	−3.44**	1.53
Number of occasions	0.26	0.89	−1.27	1.47
Status of harasser	0.48	0.95	0.91	1.24
Consequences	−0.26	0.67	0.80	4.56
Witnesses	3.06**	1.19	11.36**	4.59
Documents	2.51*	1.33	−1.75	1.35
Management reasons	0.71	1.17	−0.31	1.13
Notice	3.32**	0.84	2.25*	1.18
Organizational action	−4.87**	1.07	3.07	1.96
Case date	0.32	0.61		
Constant	−5.78		−10.70	
Pseudo R^{2c}	0.43		0.32	

[a] The coefficients can be interpreted that a one-unit change in the independent variable results in a one-unit change in the likelihood of a favorable outcome. The "log likelihood" ratio for the overall federal court case equation is $-2\ln\lambda = 98.82$, $df = 10$, $p < .01$; $N = 133$.

[b] $N = 46$.

[c] Pseudo $R^2 = $ log likelihood $\chi^2/N + $ log likelihood χ^2. Such estimated measures should be interpreted with caution.

* $p < .05$, two-tailed test
** $p < .01$, two-tailed test

By taking the antilogarithm of each of these five variables and holding all other variables constant at their proportional levels, we calculated the odds of a complainant winning a case as 40 percent if the harassment was severe, 48 percent if there were witnesses, 44 percent if there were supporting documents, 49 percent if notice had been given to management, and 53 percent if the organization took no action. If complainants had none of those factors in their favor, their odds of winning were less than 1 percent. Conversely, if complainants had all five factors in their favor, their odds of winning were almost 100 percent.

DISCUSSION

The 1986 Supreme Court decision on a sexual harassment case (*Meritor v. Vinson*) had no significant effect on the relationship between the case variables and case outcomes studied here. It is possible that the Supreme Court decision merely affirmed what some earlier appellate courts had said about sexual harassment cases.

The current study's results were similar to those reported in our 1988 study of charges brought before a state EEOC agency. Previously, we found that the severity of harassment behavior, the presence of witnesses, and the existence of notice to management were significantly related to the outcomes of cases. Our current study of federal court cases found those three variables

to be similarly related to outcomes; however, two additional significant variables emerged: whether or not complainants had supporting documents and whether or not organizations had taken investigative or remedial action.

It seems unlikely that the emergence of the two additional significant variables in the current study can be attributed to differences in the quality of complainants' cases brought before the federal courts and the EEOC because our comparing the proportions associated with the two variables in the two studies does not support such an explanation. The discrepancy between the two studies might be the result of differing decision criteria or evidentiary standards employed by the courts and the EEOC. However, this too seems unlikely as there has been little dispute between the courts and the EEOC regarding the importance of documents and organizational action. It is quite possible that the emergence of the two additional significant case variables is simply a function of the larger number of cases and greater statistical power associated with the current study.

In view of our current findings, individuals who are considering legal action on sexual harassment charges in the federal courts would be well-advised to review the strengths and weaknesses of their potential cases before proceeding. They might assess their cases along the dimensions found to influence case outcomes here. If an individual has been the victim of severe harassment, has witnesses and documents to support the allegation, has notified management of the harassment, and management has taken no action upon notification, the individual is nearly 100 percent likely to win the case. The current results also suggest several tactics that an individual might employ in dealing with future incidents of sexual harassment. A potential victim might, for example, attempt to arrange for witnesses to be present in situations in which sexual harassment has previously taken place. If harassment occurs, the victim should gather or prepare as much documentation of the incident as possible. Next, the victim should notify management of the incident through any existing grievance or complaint procedures. If management then fails to take action, the victim could proceed with formal charges.

The current results also suggest several steps that organizations might take to decrease the likelihood of future sexual harassment lawsuits and unfavorable settlements. First, the findings regarding type of behavior suggest that organizations should attempt to lessen the occurrence of the types of harassment behaviors that appear to increase their odds of losing in court; these are sexual assault, unwanted physical contact of a sexual nature, and sexual propositions linked to threats or promises of a change in conditions of employment. Organizations might use orientation and training programs for new and existing employees as a means of eliminating such sexual harassment behaviors. They might also develop forceful, formal sexual harassment policies that clearly specify the types of behaviors that are forbidden as well as the types of penalties that are associated with the occurrence of those behaviors. Severe penalties should increase the motivation of potential harassers to refrain from such behavior. Second, the findings regarding notice

suggest that organizations should develop and communicate the existence of sexual harassment complaint systems. Such systems should allow victims to bypass their immediate supervisors, who might be the harassers. A formal complaint system might help organizations resolve potential sexual harassment problems before they reach the litigation stage. Additionally, if such an in-house system exists and a complainant fails to use it before filing suit, an organization stands a better chance of winning a court case. Third, the results pertaining to the importance of organizational action indicate that organizations should take immediate investigative action upon learning of a potential sexual harassment problem. If the investigation finds merit in the sexual harassment complaint, swift action should be taken to penalize the perpetrator. Such action is wise from a legal standpoint and will also reinforce the credibility of the organization's sexual harassment complaint system in the eyes of its employees.

Finally, if an organization has been threatened with a sexual harassment lawsuit, management could review the strength of the complainant's potential case with regard to the five influential case variables we found to be significant and make an informed judgment as to the odds of successfully rebutting the charges. If the odds of success are low, the organization might opt to reach a settlement with the complainant and avoid the time, expense, and negative publicity associated with a losing court battle.

The information yielded by the current study should prove to be useful to both potential complainants and defendants involved in sexual harassment litigation at the federal court level. Future research might further expand this information base by seeking to uncover additional case-related variables that influence the outcomes of sexual harassment cases.

REFERENCES

Bundy v. Jackson, 1981. 641 F.2d 934, D.C. Cir.

Cohen, C. F. 1987. Legal dilemmas in sexual harassment cases. *Labor Law Journal,* 38: 681–688.

Hauck, V. E., & Pearce, T. G. 1987. Vinson: Sexual harassment and employer response. *Labor Law Journal,* 38: 770–775.

Koen, C. M., Jr. 1990. Sexual harassment claims stem from a hostile work environment. *Personnel Journal,* 69(8): 88–99.

Ledvinka, J. 1982. *Federal regulation of personnel and human resource management.* Belmont, CA: Kent Publishing Company.

Meritor Savings v. Vinson, 1986. 106 SCt. 2399.

Oglebay, S., & Kobak, S. E. 1987. Predicting employer liability for sexual harassment. *Employee Relations Law Journal,* 12: 412–423.

Robinson, R. K., Kirk, D. J., & Stephens, E. C. 1987. Hostile environment: A review of the implications of Meritor Savings Bank v. Vinson. *Labor Law Journal,* 38: 179–183.

Susser, P. A., & Jett, D. H. 1989. Washington scene. *Employment Relations Today,* 16(1): 81–87.

EXTRINSIC AND INTRINSIC ORIGINS OF PERCEIVED SOCIAL LOAFING IN ORGANIZATIONS

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It was hypothesized and found that task visibility and intrinsic task involvement would each be negatively associated with "social loafing" in an ongoing organization. Individuals engaged in social loafing put forth low effort when performing work in groups. Intrinsic involvement was not a significant predictor of social loafing when task visibility was controlled. However, as hypothesized, intrinsic involvement moderated the relationship between task visibility and social loafing in such a way that the relationship was strongest when intrinsic involvement was low.

One well-documented explanation for productivity losses in groups is the tendency for individual effort to decrease when people work in groups rather than individually; this tendency has been termed "social loafing" (Latane, Williams, & Harkins, 1979) and has been shown to occur for a wide variety of tasks (e.g., Earley, 1989; Harkins, Latane, & Williams, 1980). Why does social loafing occur? Prior research suggests that both extrinsic and intrinsic task-related factors are partially responsible for its occurrence. However, researchers have studied the phenomenon exclusively in laboratory settings and have not determined the extent to which those results generalize to ongoing work groups in organizational contexts. Hence, this research sought to increase understanding of social loafing as it occurs in ongoing groups. More specifically, I developed hypotheses concerning both the extrinsic and intrinsic origins of social loafing and their joint effect on individual effort in work groups.

The extrinsic explanation of social loafing focuses on the fact that individual contributions to a group product are often unidentifiable (Williams, Harkins, & Latane, 1981); when this is the case, motivation may be low since the perceived relationship between individual effort and sanctions or rewards is weak (Jones, 1984). An individual may not be able to claim any benefits from high levels of effort nor incur any penalties for low levels of effort when individual contributions to group performance are not identifiable (Jones, 1984). Indeed, laboratory experiments have documented that

social loafing does not occur when individuals working in a group think that their individual efforts or contributions are identifiable to others (Williams et al., 1981).

In a laboratory, identifiability is an absolute; at the start of a study, subjects are told whether or not their individual efforts are identifiable. In actual work settings, it is likely that workers' perceptions of identifiability or task visibility vary. Essentially, I suggest the following: perceptions of task visibility (Jones, 1984) are likely to vary across workers, and it is those perceptions that influence social loafing. Perceived task visibility is the belief that a supervisor is aware of individual effort on a job. When task visibility is low, workers think that it is difficult for their supervisor to determine how hard they are working and how much effort they exert on the job; social loafing may occur because workers believe it will go unnoticed and thus, negative consequences will not ensue. Conversely, when perceived task visibility is high, workers believe that their supervisor is aware of levels of individual effort and thus, are less likely to engage in social loafing. Hence,

> Hypothesis 1: Task visibility is negatively related to social loafing.

However, although extrinsic motivation is a powerful force (Lawler, 1971), workers can be intrinsically interested in the work they do (e.g., Hackman & Oldham, 1980). When intrinsic motivation is high, supervisors may not need to monitor workers' efforts very closely to sustain adequate levels of performance. Consistent with this reasoning are research findings that intrinsic involvement in a task itself eliminates social loafing in laboratory situations (e.g., Harkins & Petty, 1982; Brickner, Harkins, & Ostrom, 1986). For example, Harkins and Petty (1982) found that social loafing did not occur when individuals thought that they could make a unique contribution to group performance, even when their contributions were unidentifiable. Building from these findings, Brickner, Harkins, and Ostrom (1986) found—again, in a laboratory setting—that social loafing did not occur when a task was high in personal involvement, but it did occur for tasks low in personal involvement. Hence,

> Hypothesis 2: An individual's intrinsic involvement in work is negatively associated with social loafing.

I defined intrinsic involvement as beliefs that the work being done is meaningful and significant and that one's own efforts are an important contribution to the employing organization.

In the laboratory, the extrinsic and intrinsic origins of social loafing can be treated as independent. In actual work situations, however, this independence is unlikely. That is, when task visibility is low and work is performed in groups, individuals may perceive their efforts as dispensable and not necessary for a group to be effective (Kerr & Bruun, 1983). If people see their

efforts as dispensable, it is likely that they will see their work as making less of a contribution and as less significant and meaningful than they would otherwise. Moreover, individual inference processes may result in a positive association between the extrinsic and intrinsic factors. For example, if individuals perceive task visibility to be low, they may also evaluate the work they do as not meaningful and significant and as making little organizational contribution: if my supervisor is not aware of my efforts, they must not be that important. Conversely, if individuals do evaluate their work as high in meaning, significance, and contribution, they may be more likely to infer that others will be aware of their efforts. Hence, I expected the intrinsic and extrinsic origins of social loafing to be correlated positively.

Given that expected association, it is not clear which, if either, cause is dominant. Results of the laboratory experiments conducted on social loafing do not provide a firm answer to this question. However, there is one critical difference between social loafing in the laboratory and social loafing in actual organizations. A fundamental source of motivation for most workers is work's economic instrumentality (e.g., Brief & Aldag, 1989). Indeed, the manifest function of work is to provide a living for the worker (Jahoda, 1981), and few workers would remain on their jobs if economic outcomes were eliminated (Rice, Phillips, & McFarlin, 1990). Hence, a very basic notion of economic exchange underlies the relationship between an individual and an organization (Jones, 1984).

Jones (1984) reasoned that economically motivated individuals exert effort on the job to the extent that they think their effort will be rewarded or their lack of effort faulted. If people think that their supervisor is generally not that aware of individual effort and work is performed in groups, it may be economically rational for them to engage in social loafing (Albanese & Van Fleet, 1985). That is, if individuals perceive task visibility to be low, they will think they can reap the benefits of overall group performance at little personal cost in terms of effort expended. Hence,

> Hypothesis 3: Task visibility will dominate intrinsic task involvement in terms of relative ability to predict social loafing in an ongoing organization.

However, I expected intrinsic involvement in work to moderate the relationship between task visibility and social loafing. Thus,

> Hypothesis 4: Intrinsic involvement moderates the relationship between task visibility and social loafing such that the relationship is stronger when intrinsic involvement is low than when intrinsic involvement is high.

Since workers must be physically present on the job, high intrinsic involvement in their work may lessen social loafing even when task visibility is low since job performance may be self-reinforcing and a means to alleviate boredom. When tasks are intrinsically involving, performing them is rewarding

regardless of supervisory awareness of efforts. Conversely, when intrinsic involvement is low, workers will be highly motivated to engage in social loafing. In such cases, performing tasks for their own sake is not likely; therefore, performance should be more contingent upon perceptions of task visibility than it is when intrinsic involvement is high.

In addition, when intrinsic involvement is high workers may feel that their efforts are very important for the success of their group and thus may be unlikely to engage in social loafing even if task visibility is low. This argument is based in part on the fact that people generally consider themselves to be above average on a variety of dimensions (Goethals & Zanna, 1979; Jellison & Riskind, 1970; Myers, 1980). If the work to be done is considered high on significance, meaningfulness, and contribution, individuals may see their own above-average efforts as making an important contribution to group performance. Conversely, when intrinsic involvement is low, workers may feel that their efforts are not really needed or are not that important for group performance, since other members of the group will duplicate their efforts and are probably capable enough for the tasks at hand; in such circumstances, social loafing will be more strongly associated with task visibility than it is when intrinsic involvement is high. Harkins and Petty's (1982) laboratory finding that social loafing did not occur both on a difficult task and a task in which people could make a unique contribution fits this reasoning; under these two conditions, individuals might have felt that their own above-average efforts made an important contribution to group performance. Hence, they did not engage in social loafing even though their individual contributions were not identifiable. Thus, social loafing may occur because individuals think that their efforts are not really needed and will be duplicated by others; when intrinsic involvement is high, individuals may think that their own contributions are highly important for group performance in part because of people's tendency to consider themselves as above average (Harkins & Petty, 1982).

METHODS

The data for this research came from a larger study involving salespeople working for a large retailer in the southwestern United States (George, 1991). All the salespeople included in the study had the same job title. They were organized into primary work groups, each of which was responsible for such tasks as customer service and housekeeping in a given area.[1] Questionnaires and postage-paid return envelopes were distributed to the salespeople

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[1] The groups had daily, weekly, and monthly goals. The first depended on the particular tasks that needed to be accomplished on a given day, such as unloading a truck and setting up the new merchandise, whereas the weekly and monthly group goals pertained to the sales performance of the group. A variety of group incentives were used, including recognition, money and merchandise, competitions and contests, and special acknowledgments like a banquet for an outstanding group. The company also used individual incentives and goals, and individual performance was assessed along a number of dimensions (e.g., cooperation).

at work. They were instructed to complete the questionnaires and return them directly to me, so management never had access to the completed questionnaires. Complete confidentiality was guaranteed, and participation was voluntary.

The salespeople's supervisors were asked to complete a rating form for each of their subordinates. A measure of social loafing was included in the rating forms. The supervisors received the forms at work with postage-paid envelopes in which they could mail their completed forms directly to me. Completion of the rating forms was voluntary, and complete confidentiality guaranteed.

Salespeople returned 221 of the 565 questionnaires distributed, for a 39 percent response rate. Of the 33 supervisors given rating forms, 26 returned completed forms, for a 79 percent response rate. Because of missing data, the numbers of respondents used for the analyses ranged from 182 through 221. The majority of the salespeople were women (84%). Education levels varied, but 49 percent of the respondents reported having attended college or technical school. Approximately 44 percent were married.[2]

Measures

Task visibility. Task visibility was measured with a six-item scale (see the Appendix). Scale items referred to the salespeople's beliefs about the extent to which their supervisors were aware of how much effort they exerted on the job and how hard they worked.[3]

Intrinsic involvement. As indicated above, three indicators of intrinsic involvement were used. I chose these indicators so as to be consistent with both the job design and social loafing literatures (e.g., Hackman & Oldham, 1980; Harkins & Petty, 1982). The first indicator, *task significance*, was measured with the task significance scale of the Job Diagnostic Survey (JDS; Hackman & Oldham, 1980). The second indicator of intrinsic involvement, *task meaningfulness*, was measured with the JDS scale entitled "experienced meaningfulness of the work." The third indicator, *contribution*, measured the extent to which the salespeople thought that they could make an

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[2] The retailer's upper management indicated that the demographic profile of the respondents in this study was typical of their salespeople in general, thereby providing some evidence for lack of nonresponse bias.

[3] Prior to developing the task visibility and social loafing scales, I discussed the two constructs, their relevance to the respondents, and ways to measure them with the store's upper management. After the scales were developed, I collected some additional qualitative data from a group of salespeople and a group of supervisors and upper managers, seeing each group separately. I described task visibility and social loafing and discussed them with the group until I felt confident that they understood the constructs. I then asked them to read the items and indicate if they did, in fact, capture the constructs. There was general agreement in both groups that the items did measure their respective constructs. Additionally, the social loafing scale was significantly associated ($r = .72$, $p < .001$) with a one-item scale, also completed by the supervisors, which asked them to indicate the extent to which the salesperson they were rating put forth less effort than the other members of his or her work group.

important contribution to their organization with three items, which appear in the Appendix.

Social loafing. Social loafing was measured with a ten-item scale (see the Appendix) measuring the extent to which a salesperson tended to put forth low effort on the job when other salespeople were present to do the work.

RESULTS

Table 1 presents means, standard deviations, correlations, and coefficient alphas for the study variables. The zero-order correlations offer support for Hypotheses 1 and 2. Supporting Hypothesis 1, the correlation between task visibility and social loafing, $-.29$, was statistically significant at the .001 level. In support of Hypothesis 2, each indicator of intrinsic involvement was significantly and negatively associated with social loafing; these correlations were $-.15$ ($p < .05$) for task significance, $-.22$ ($p < .001$) for task meaningfulness, and $-.21$ ($p < .01$) for contribution. However, when I tested Hypotheses 1 and 2 by entering the four predictors of social loafing into a regression equation, only task visibility remained a significant predictor. These regression analysis results, which are presented under step one in Table 2, lend support for Hypothesis 1 but not Hypothesis 2. Consistent with expectations, task visibility was significantly and positively associated with each indicator of intrinsic involvement.

Hypothesis 3 predicts that when the combined effects of task visibility and intrinsic involvement are considered, task visibility will better predict social loafing. I tested this hypothesis by entering the four predictors into a regression equation and examining their beta weights. Table 2 (step one) presents results of this analysis.

In support of Hypothesis 3, the beta weight for task visibility was statistically significant ($-.23$; $p < .01$), whereas the betas for the three indicators of intrinsic involvement were nonsignificant. This analysis suggests that intrinsic involvement is not a significant predictor of social loafing when

TABLE 1
Summary Statistics

Variables	Means	s.d.	Correlations[a]				
			1	2	3	4	5
1. Task visibility	28.87	7.89	(.84)				
2. Task significance	4.75	1.44	.23***	(.75)			
3. Task meaningfulness	4.56	1.20	.41***	.55***	(.76)		
4. Contribution	17.75	2.90	.15*	.47***	.42***	(.70)	
5. Social loafing	16.32	6.96	$-.29$***	$-.15$*	$-.22$***	$-.21$**	(.93)

[a] Coefficient alphas are in parentheses on the diagonal.
* $p < .05$
** $p < .01$
*** $p < .001$

TABLE 2
Results of Hierarchical Regression Analysis

Independent Variables	β	R^2	ΔR^2
Step one			
Contribution	−0.13		
Task meaningfulness	−0.08		
Task significance	0.01		
Task visibility	−0.23**		
		.11***	.11***
Step two			
Task visibility by contribution	1.32*		
Task visibility by task meaningfulness	1.26*		
Task visibility by task significance	0.13		
		.19***	.08***

* $p < .05$
** $p < .01$
*** $p < .001$

task visibility is taken into account, but task visibility remains a significant predictor when intrinsic involvement is considered. Using a formula provided by Cohen and Cohen (1983: 479), I tested whether the differences between the betas were statistically significant. In partial support of Hypothesis 3, the difference between the coefficients for task visibility and task significance was statistically significant at the .05 level. However, the differences between the coefficients for task visibility and those for contribution and task meaningfulness did not reach conventional levels of statistical significance.

Hypothesis 4 predicts that intrinsic involvement will moderate the relationship between task visibility and social loafing. This hypothesis was tested using hierarchical regression (Stone & Hollenbeck, 1984). I entered task visibility and the three indicators of intrinsic involvement at the first step. At the second step, the products of task visibility and each measure of intrinsic involvement were entered as a set. A significant interaction effect is indicated by a statistically significant proportion of the variance in a dependent variable being explained by the set of product terms in a regression equation already containing the main effects. As indicated in Table 2 (step two), the task visibility by intrinsic involvement interactions as a set accounted for a significant proportion of variance in social loafing beyond that accounted for by the main effects ($\Delta R^2 = .08$, $p < .001$). These results support Hypothesis 4. The interactions of task visibility with both contribution and task meaningfulness were statistically significant, whereas the task-visibility-by-task-significance interaction was nonsignificant.

Figure 1 depicts these interaction effects graphically. I regressed social loafing on task visibility for conditions of low and high task meaningfulness and low and high contribution, forming these conditions by splitting the respondents into subgroups based on the median of each of the two indica-

FIGURE 1
Graphs of the Moderating Effects of Task Meaningfulness and
Contribution on the Task Visibility–Social Loafing Relationship[a]
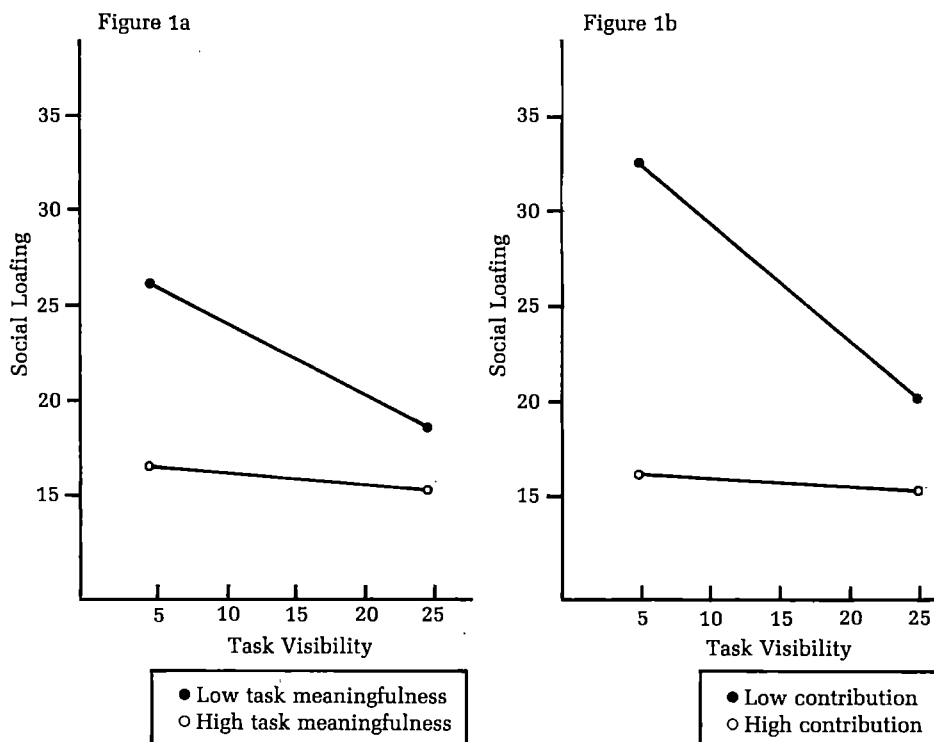
[a] The equations for the graphs are as follows: for low task meaningfulness, $\hat{y} = -.42$ *task visibility* $+ 28.99$; for high task meaningfulness, $\hat{y} = -.05$ *task visibility* $+ 16.66$; for low contribution, $\hat{y} = -.65$ *task visibility* $+ 36.41$; and for high contribution, $\hat{y} = -.08$ *task visibility* $+ 17.65$.

tors (task meaningfulness, 4.75; contribution, 18.00). In support of Hypothesis 4, the relationship between task visibility and social loafing was strongest when both indicators of intrinsic involvement were low. Providing additional evidence, the subgroup correlations indicate a strong negative relationship between task visibility and social loafing when intrinsic involvement is low and a very weak negative relationship when intrinsic involvement is high. The correlations between task visibility and social loafing were as follows: $-.37$ ($p < .001$) for the low task meaningfulness subgroup; $-.06$ (n.s.) for the high task meaningfulness subgroup; $-.53$ ($p < .001$) for the low contribution subgroup; and $-.11$ (n.s.) for the high contribution subgroup.

DISCUSSION

The results of this study suggest that both extrinsic and intrinsic forces influence social loafing in ongoing work groups in organizational contexts.

Findings were consistent with the results of prior research conducted in the laboratory (e.g., Williams et al., 1981): social loafing was more likely to occur when individuals perceived task visibility to be low. In addition, intrinsic involvement, as indexed by task significance, task meaningfulness, and contribution, was associated with low social loafing, a finding also consistent with the results of laboratory studies suggesting that various types of intrinsic involvement lower levels of social loafing (e.g., Brickner et al., 1986; Harkins & Petty, 1982). However, when I considered the combined effects of the extrinsic and intrinsic influences, task visibility remained a significant predictor with intrinsic involvement controlled, but intrinsic involvement was not a significant predictor with task visibility controlled. This finding supports economic explanations for social loafing suggesting that, since the employment relationship is fundamentally one of economic exchange, workers will be motivated to engage in social loafing when they think that their behavior is not being monitored (Jones, 1984). Nonetheless, it should be kept in mind that the beta for task visibility significantly differed from the involvement beta for only one of the three indicators of intrinsic involvement.

However, intrinsic involvement is not unimportant for understanding social loafing. Rather, I found that intrinsic involvement moderated the relationship between task visibility and social loafing, as was hypothesized. For two of the indicators of intrinsic involvement, task meaningfulness and contribution, that relationship was relatively strong when involvement was low and very weak when involvement was high. Hence, it may be more appropriate to view intrinsic involvement as a moderator of the relationship between task visibility and social loafing rather than as a direct influence on social loafing. To the extent that future research replicates this finding, it has important implications for managers. For example, when work is performed in groups and the situation—the type of task, for instance—dictates that task visibility will be low, it may be crucial for employers to try to maintain high levels of employees' intrinsic involvement. This could be achieved in a variety of ways. The job might be redesigned or enriched (Hackman & Oldham, 1980), or effort might be devoted to communicating to workers the importance of their efforts for the success of their group and organization. Nonetheless, it should be recognized that certain jobs are very dull, boring, and simple for most workers to perform, and sometimes it is not economically feasible to redesign such jobs. When that is the case, it is important for employers to maintain high levels of task visibility by, for instance, monitoring individual output, having a strong supervisory presence, and keeping groups small. The greatest reduction in social loafing is likely to occur when individuals are made accountable for specific tasks. Conversely, on jobs that are high on intrinsic involvement, task visibility may not need to be as salient a concern, even when the work is performed in groups. Hence, when intrinsic involvement is high, organizations may be able to save on supervisory costs, since close monitoring of workers may not be necessary.

This study is not without limitations. For example, it should be noted

that all the questionnaire respondents had a low-level job in their organization. Whether these findings generalize to workers in higher-level positions with more responsibility is an empirical question. It should also be acknowledged that generally low levels of social loafing were reported. Hence, there may have been some restriction of range on this variable.

These and other limitations notwithstanding, the results of the current study suggest that both the extrinsic and intrinsic explanations of social loafing are important for understanding this phenomenon as it occurs in work groups in ongoing organizational contexts. By increasing our understanding of the effects of task visibility and intrinsic involvement on social loafing, researchers will be in a better position to try to reduce its occurrence.

REFERENCES

Albanese, R., & Van Fleet, D. D. 1985. Rational behavior in groups: The free-riding tendency. *Academy of Management Review,* 10: 244–255.

Brickner, M. A., Harkins, S. G., & Ostrom, T. M. 1986. Effects of personal involvement: Thought-provoking implications for social loafing. *Journal of Personality and Social Psychology,* 51: 763–769.

Brief, A. P., & Aldag, R. J. 1989. The economic functions of work. In G. R. Ferris & K. M. Rowland (Eds.), *Research in personnel and human resources management:* 1–23. Greenwich, CT: JAI Press.

Cohen, J., & Cohen, P. 1983. *Applied multiple regression/correlation analysis for the behavioral sciences.* Hillsdale, NJ: Erlbaum.

Earley, P. C. 1989. Social loafing and collectivism: A comparison of the United States and the People's Republic of China. *Administrative Science Quarterly,* 34: 565–581.

George, J. M. 1991. State or trait: Effects of positive mood on prosocial behaviors at work. *Journal of Applied Psychology,* 76: 299–307.

Goethals, G., & Zanna, M. 1979. The role of social comparison in choice shifts. *Journal of Personality and Social Psychology,* 37: 1469–1476.

Hackman, J. R., & Oldham, G. R. 1980. *Work redesign.* Reading, MA: Addison-Wesley.

Harkins, S. G., Latane, B., & Williams, K. 1980. Social loafing: Allocating effort or taking it easy. *Journal of Experimental Social Psychology,* 16: 457–465.

Harkins, S. G., & Petty, R. E. 1982. The effects of task difficulty and task uniqueness on social loafing. *Journal of Personality and Social Psychology,* 43: 1214–1229.

Jahoda, M. 1981. Work, employment, and unemployment: Values, theories, and approaches in social research. *American Psychologist,* 36: 184–191.

Jellison, J. M., & Riskind, J. 1970. A social comparison of abilities interpretation of risk-taking behavior. *Journal of Personality and Social Psychology,* 15: 375–390.

Jones, G. R. 1984. Task visibility, free riding, and shirking: Explaining the effect of structure and technology on employee behavior. *Academy of Management Review,* 9: 684–695.

Kerr, N. L., & Bruun, S. E. 1983. Dispensability of member effort and group motivation losses: Free-rider effects. *Journal of Personality and Social Psychology,* 44: 78–94.

Latane, B., Williams, K. D., & Harkins, S. 1979. Many hands make light the work: The causes and consequences of social loafing. *Journal of Personality and Social Psychology,* 37: 822–832.

Lawler, E. E., III. 1971. *Pay and organizational effectiveness: A psychological view.* New York: McGraw-Hill.

Myers, D. 1980. *The inflated self.* New York: Seabury Press.

Rice, R. W., Phillips, S. M., & McFarlin, D. B. 1990. Multiple discrepancies and pay satisfaction. *Journal of Applied Psychology,* 75: 386–393.

Stone, E. F., & Hollenbeck, J. R. 1984. Some issues associated with moderated regression. *Organizational Behavior and Human Performance,* 34: 195–213.

Williams, K., Harkins, S., & Latane, B. 1981. Identifiability as a deterrent to social loafing: Two cheering experiments. *Journal of Personality and Social Psychology,* 40: 303–311.

APPENDIX

Task Visibility

Responses were made on a seven-point scale ranging from 1, "strongly disagree," to 7, "strongly agree"; responses to the items were summed.

1. My supervisor is generally aware of when a salesperson is putting forth below average effort.
2. My supervisor is aware of the amount of work I do.
3. It is generally hard for my supervisor to figure out how hard I am working (reverse-scored).
4. My supervisor usually notices when a salesperson is slacking off.
5. It is difficult for my supervisor to determine how hard we are working (reverse-scored).
6. It is hard for my supervisor to determine how much effort I exert on the job (reverse-scored).

Contribution

The response format was the same as that for task visibility.

1. I think that I can make a unique contribution to how successful [organization name] is.
2. How I perform my job is important for [organization name].
3. [Organization name's] success hinges on salespeople like myself.

Social Loafing

Supervisors were instructed to indicate how characteristic each of the items were of the salesperson they were rating on a five-point scale ranging from 1, "not at all characteristic," to 5, "very characteristic"; responses to the items were summed.

1. Defers responsibilities he or she should assume to other salespeople.
2. Puts forth less effort on the job when other salespeople are around to do the work.
3. Does not do his or her share of the work.
4. Spends less time helping customers if other salespeople are present to serve customers.
5. Puts forth less effort than other members of his or her work group.
6. Avoids performing housekeeping tasks as much as possible.
7. Leaves work for the next shift which he or she should really complete.

8. Is less likely to approach a customer if another salesperson is available to do this.
9. Takes it easy if other salespeople are around to do the work.
10. Defers customer service activities to other salespeople if they are present.

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EXAMINING MANAGERIAL DISPLACEMENT

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The research reported used a longitudinal analysis to compare the displacement experience of managers with that of other employees and to examine the factors associated with managerial job loss. Job displacement occurs when employees are permanently separated from their employer when their job disappears. After controlling for individual and industry characteristics, I found that during the mid-1980s managers were actually more vulnerable to displacement than were other employees, suffering proportionately greater job loss from efforts to streamline and downsize organizations and from plant closings.

Discussions of the unemployment associated with structural changes in the U.S. economy have generally ignored effects on managerial jobs in part because managers seemed insulated from such changes. Managers in many organizations assumed that, in return for loyalty and commitment to their employers and acceptable levels of performance, they had implicit contracts that gave them job security as long as the organizations survived (cf. Smith, 1988). Firms may also have been reluctant to dismiss managers because their skills are often unique to a firm and therefore difficult to replace; managers themselves may have been reluctant to quit because there was little outside market for their skills (e.g., Pfeffer & Cohen, 1984). Finally, managers are the ones who make layoff decisions, and they may have protected their own jobs in the process of making those decisions.

MANAGERIAL JOB LOSS

Sharp increases in layoffs and in unemployment across the economy as a whole in the 1980s signaled an end to many long-term employment relationships, including those of managers and their firms. For example, a *Business Week* survey found that 40 percent of the firms responding had cut their middle management ranks in 1982 and that half had made such cuts in every department (*Business Week*, 1983). Further, the cause of management job losses appeared to be "thinning," or restructuring efforts that eliminate entire layers of management, a practice that might not have ended with the recession. *Fortune* (1985) reported that since 1980, 89 of the 100 largest U.S.

corporations had undergone total corporate restructuring that included man-
agement layoffs, and another survey in 1985 reported that almost 30 percent
of the firms responding said they had fewer layers of management than they
had had five years previously (Levine, 1986). ·

One-period surveys like those just cited cannot reveal the extent to
which managerial layoffs are a new phenomenon. Scholars as far back as the
1950s have argued that changing information-processing technologies will
lead to management layoffs (Leavitt & Whisler, 1958). Comparisons of occu-
pational unemployment rates over time are the only measures that might
indicate whether the managerial layoffs of the 1980s were a new phenome-
non. According to the Bureau of Labor Statistics' *Employment and Earnings*,
managerial unemployment rates were negligible in the 1960s—below 1 per-
cent. Even when overall unemployment rose to 7 percent, managerial un-
employment never rose above 1 percent. In contrast, when overall unem-
ployment was 7 percent in the 1980s, managerial unemployment had grown
to 3 percent, an enormous increase over the 1960s' rate. Estimates from the
Bureau of Labor Statistics indicate that the number of unemployed managers
in 1990 was 12 percent higher than it was in 1989, suggesting that manage-
rial layoffs may not be over (*Wall Street Journal*, 1990).

There are limits, however, to what unemployment rates can reveal about
the security of managerial employment. The rates measure the proportion of
people seeking jobs. Higher managerial unemployment may reflect changes
other than greater managerial job losses, such as an increase in the number
of people seeking such jobs, managers suffering long periods of job loss and
having greater difficulty finding new jobs, and a decline in the rate of re-
tirement following job loss. Unemployment rates also do not tell why job
seekers are without work: whether they quit, were fired for poor perfor-
mance, or were displaced or laid off. The surveys of corporations noted
above have similar problems in that they tell us about managerial job titles
but not about the actual experience of managers. For example, firms may cut
managerial job titles but retain the managers in other positions.

The Displaced Worker Survey

Were managerial jobs in the 1980s really more secure than other jobs?
Answering that question requires data on displaced workers rather than
general unemployment data and an analysis that controls for characteristics
that may be associated with managerial jobs. A survey of displaced workers
conducted as part of the Current Population Survey of the U.S. Census, first
in 1984 and then again in 1986, meets those requirements. The 1984 survey
was designed to identify workers whose jobs permanently disappeared, as
distinct from people who voluntarily quit, were fired for poor performance,
or were temporarily laid off. The survey asked, "Since January 1979, have
[you] lost or left a job because of a plant closing, an employer going out of
business, a layoff from which [you] were not recalled, or other similar rea-
sons?" Between 1979 and 1984, 13.9 million workers met the definition, and
the 1986 survey suggested that 10.8 million workers lost their jobs between

TABLE 1
Percentages of Workers Displaced[a]

Years	Managers	All Other White-Collar Employees	Blue-Collar Employees
1979	1.14%	0.92%	2.28%
1980	1.39	1.30	3.04
1981	1.21	1.05	2.56
1982	1.76	1.48	3.43
1983	1.79	1.62	3.08
1984	1.99	1.68	3.37
1985	2.78	2.45	5.52
Totals	12.06	10.50	23.28

[a] The source is the Current Population Survey for 1979–85.

1981 and 1985.[1] These data provide some descriptive information about managerial displacement.

The Bureau of Labor Statistics used descriptions of jobs provided by the respondents to assign them to broad occupational groups. I used the census category "executive, administrative, and managerial occupations" to define managers.[2] Other nonmanagerial, white-collar jobs, including professional specialties and technical, sales, and clerical positions, were excluded. Unlike many other white-collar workers, managers are likely to have skills that are specific to individual employers and, as a result, are more closely tied to internal labor markets. Their attachment to employers is thus much stronger than the attachment of those in other top-level occupations, making the displacement experience of managers especially interesting.

Data from the 1984 displaced worker survey indicated that managerial and professional employees accounted for about 14 percent of all displaced workers, and the 1986 survey found a slightly higher figure of 17 percent. Table 1 reports numbers of displaced workers as a percentage of all workers in broad occupational groups for the period 1979–85. As the table surprisingly shows, managers experienced greater proportionate displacement than other white-collar workers.

Table 1 also indicates that the rate of displacement rose for all occupa-

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[1] The Bureau of Labor Statistics removed job losses resulting from seasonal effects and losses by workers with less than three years tenure with their current employers, an arbitrary limit designed to identify those with a significant attachment to their employers. It defined 5.1 million workers from the 1984 and 1986 surveys as displaced. Flaim and Seghal (1985) described the 1984 survey and its results, and Horvath (1987) gave a similar analysis of the 1986 survey. The figures used here include all workers, regardless of tenure, because my concern was to identify permanent job loss.

[2] This census classification includes some occupations, such as undertakers and legislators, that do not truly fit my focus on managers in organizations. Unfortunately, occupations were not coded in the displaced worker supplement, so these subclassifications could not be identified. In any case, such nonmanagerial occupations make up a trivial percentage of the jobs falling under this general heading.

tions through 1983 as the recession grew, albeit with some fluctuation in the blue-collar group, but then kept rising for white-collar and management jobs even when the economic recovery was well under way, after 1983 (the recession continued at least through 1985 in manufacturing, however). Perhaps employers simply delayed cutting managerial and other white-collar jobs, leaving those cuts as the final option when costs and jobs had been cut in every other area. It does appear, however, that the forces driving the displacement trend were at least in part independent of the business cycle effects associated with the recession.

Displacement Decisions

Dismissals result from decisions by employers to end employment relationships, in contrast to quitting, a situation in which workers make those decisions. Displacement occurs when employees are dismissed for reasons that are independent of their ability to perform their current jobs. Of course, organizations can raise their dismissal rate as an alternative to displacement (*San Francisco Chronicle*, 1989). But it is the fact that job loss clearly appears to be beyond the workers' control that has made displacement the focus of public policy concern.

A general theory of displacement can be fashioned from cost-benefit and "human capital" arguments: workers who contribute less than their wage will be displaced, and the first to be displaced will be those with the most negative contribution. Thus, the probability of dismissal can be represented as $f(1/MRP - w)$, where MRP is the marginal revenue product, or the contribution of the workers—a variable that depends on the characteristics of their jobs as well as on their personal performance—and w is wages. The decision to displace workers rather than fire them for poor performance implies that an organization has changed in a way that has caused the value of certain jobs to fall. Factors associated with jobs should be the central issue determining displacement. But the decision governing who gets displaced may still involve individual characteristics. If organizations have excess account managers, for example, they may transfer some outstanding account managers to other jobs and dismiss poor performers. Managers may well have more of the desirable characteristics meriting retention, such as high experience and education, than other workers. Thus, it may be necessary to control for such characteristics in order to identify whether managers per se have suffered disproportionate levels of displacement.

According to economic theory, wages should be equal to marginal revenue products in equilibrium, and there should be no differences in the probability of displacement across occupations because the marginal job in each occupation should have the same contribution net of the wage—zero. Organizations are not always in equilibrium, however. Some functions may become technologically obsolete, for instance, or products whose production is dominated by particular occupations may decline. Both processes may cause the net contribution of certain jobs to fall disproportionately.

There are three general circumstances in which organizations displace

employees. The first is associated with business cycle recessions and slack work, or a lack of demand. When organizations believe that the decline in demand for their products or services is only temporary, closing facilities is not justified, but the decline may go on long enough that short-term layoffs are not sufficient. Employers may resist laying off workers like managers whose skills are specific to the company and who are hard to replace because the employers will need those skills when business returns. Instead, they lay off other workers whose skills are more general because it is easier to replace them. This may explain the historical pattern of layoffs in industries sensitive to business cycles, such as autos and steel, where production workers, whose skills are general, have been laid off while managers, whose skills are specific to given firms, are retained.

The second circumstance in which displacement occurs is the closing of an entire facility because an organization does not believe that demand for the output of the facility will return in the near future. Virtually every job in the facility is eliminated, including those requiring skills specific to the firm, such as management positions. Plant closings were a central feature of the restructuring of the U.S. economy in the 1980s and are thought to have been a particular problem for production workers (General Accounting Office, 1986). The management functions in multiplant firms are disproportionately concentrated at headquarters. And because the average plant employs a smaller percentage of managers than the organization as a whole, the average plant closing should displace a disproportionate percentage of nonmanagerial jobs. I therefore expected plant closings to have less of an impact on managers than on other workers.

The third circumstance in which displacement occurs, and the one that has perhaps received the most popular attention, is the thinning of an existing operation by eliminating jobs while maintaining their functions. Kanter (1986) argued, for example, that new information systems are rapidly eliminating the need for middle managers by taking over their function of managing communications and the flow of information between the tops and bottoms of organizations. Osterman (1986) found that, on the average, high computer use was associated with a decline in managerial employment.

Perhaps a more important explanation for the thinning of management positions is changing human technology, based on new theories about how people and organizations should be managed. One aspect of this change has been the rise of participative management and quality-of-work-life programs that transfer much of the supervisory function to work groups and eliminate the role of supervisors (cf. Klein, 1988). The effort to streamline organizations by eliminating entire levels of management, noted in the business press surveys cited above, is related to management arguments that decision making should be pushed downward in organizations, away from central management and toward line or operations management, where day-to-day decisions are made. A Conference Board survey found, for example, that significant amounts of responsibility have shifted to line management in recent years (Freedman, 1985). These arguments suggest that many of the efforts to

thin organizations have been directed at management and that managers may have experienced more displacement from thinning than have other workers.[3]

THE CURRENT RESEARCH

Hypotheses

The hypotheses tested in this study were as follows:

Hypothesis 1: With various characteristics associated with managers and managerial jobs controlled, managers will suffer significantly less displacement from slack work than other employees.

Hypothesis 2: With various characteristics associated with managers and managerial jobs controlled, managers will suffer significantly less displacement from plant closings than other employees.

Hypothesis 3: With various characteristics associated with managers and managerial jobs controlled, managers will suffer significantly more displacement from organizational thinning than other employees.

Hypothesis 4: With various characteristics associated with managers and managerial jobs controlled, managers will suffer significantly less displacement from all causes than other employees.

Some information relevant to these hypotheses can be gained by looking at average displacement rates in the displaced worker survey. The survey classified the proximate cause of job loss under the following headings: "slack work," "plant closures," "positions abolished," "seasonal job completions," "self-operated-business failures," and "other." As noted above, slack work is associated with temporary declines in demand such as those experienced in recessions, plant closings with structural changes and more permanent reductions in demand, and positions abolished with organizational thinning.

Table 2 outlines the causes of displacement by broad occupational groups. Managers appear to have been hurt the least by slack work, which is consistent with the traditional notion that managers enjoy protection from

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[3] The explosion of corporate mergers and acquisitions is another potential source of managerial displacement. The combination of two or more organizations into one obviously means that duplicate functions will be eliminated, and many of those functions may be managerial. The heaviest layoffs may therefore be at the corporate level (*Wall Street Journal*, 1986). The merger wave did not become important until the end of the period considered here, although many companies had previously begun to cut their management ranks to prevent takeovers (Fortune, 1985).

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TABLE 2
Causes of Displacement[a]

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Causes	Managers	All Other White-Collar Employees	Blue-Collar Employees
Plant closing	43%	39%	41%
Slack work	18	25	37
Position abolished	17	16	8
Seasonal job	2	3	5
Self-operated business failure	7	3	2

[a] The source is the Current Population Survey for 1979–85. Columns do not total 100 percent because "other" causes of displacement are not included.

recessions and other cyclical downturns. But, as the table indicates, managers were not protected from other pressures. For example, even though most workers who lost their jobs through plant closings had blue collars, plant closings accounted for proportionately more managerial displacement than any other occupational group's. Positions eliminated accounted for slightly more managerial displacement than it did for the other occupational groups, although the difference was not great. The experience of managers with displacement seems to differ by cause of job loss. It was important to see whether those differences persisted when characteristics associated with management jobs were controlled.

Research Design

Previous analyses of displacement have employed cross-sectional data to compare characteristics of displaced workers with characteristics of those still employed (e.g., Addison & Portugal, 1987; Podgursky & Swaim, 1987). The best way to examine who gets displaced is to use a longitudinal approach: identify a sample of workers, follow them over time to see which ones get displaced, and then compare the characteristics of the displaced workers to those of the nondisplaced workers. It was possible to conduct such an analysis by combining data from the Current Population Survey and its displaced worker supplement.

The Current Population Survey contains eight subsamples, of which one is added and one dropped each month. The Bureau of the Census surveys each subsample for four months, rotates it out of the survey for eight months, and then returns it for four months. In any given month, therefore, half the sample had also been surveyed exactly one year before. To examine how displaced workers differ from nondisplaced workers, I began by identifying the people interviewed in January 1983 who were subsequently resurveyed as part of the January 1984 displaced worker supplement of the Current Population Survey. Within this subsample, I identified the group that was employed in January 1983 and then observed whether or not its members were displaced in 1984. Unfortunately, the survey cannot track respondents for more than one year, hence the short time series, and census bureau errors

in coding the 1985–86 survey made it impossible to develop a similar sub-sample for the 1986 displaced worker survey. Dopkowski (1980) discusses this problem. Therefore, these were the only longitudinal data that could be developed on displaced workers from these surveys.

Event history analysis (Allison, 1982) is useful in assessing displacement. The event of displacement may not happen to all workers and certainly will not happen to all during a given period of observation. Those at risk of displacement—those currently employed and not already displaced—constitute the risk set, and the probability of their being displaced is the hazard rate. This rate is a function of fixed variables, such as the characteristics of the individuals, but is also a function of the period in which displacement occurs and therefore of time-variant variables as well. The hazard rate was defined as $h(t) = \lim P(t, t + s/s)$, where h is the rate of the event, t is time, and s is the interval of observation. Therefore, $1/h(t)$ is the period until the event occurs. Since an event may happen after a period of observation is over, data so-gathered are "right-censored." Because I had only one observation of displacement, much displacement was likely to have occurred after the period and was therefore unobserved. Maximum likelihood regression techniques were used as they are asymptotically unbiased and efficient with censored data of this kind. Maximum likelihood ratios measure the overall predictive power of equations by comparing the maximum likelihood under the null hypothesis to the unrestricted maximum likelihood. Values close to 1 suggest that the null hypothesis should be accepted.

Variables

The survey data identified several causes of displacement. Each cause may be attributable to a distinct set of factors, and each eliminates respondents from the risk set; if workers are displaced because of a plant closing, they are no longer at risk of being displaced from those jobs for any other cause. Such models are known as "competing risk" models, and the hazard rate is simply the linear combination of the rate for each competing cause. To the extent that the factors influencing displacement differ by cause, they should be included in a model. I therefore separately examined displacement associated with slack work, plant closings, and positions eliminated.

In addition to identifying whether respondents held managerial jobs, the census data gave their ages and educational levels, measured in years. I used the difference between those figures as a rough proxy for years of employment; age was excluded as a variable because it is perfectly collinear with education and experience. With wages and other variables held constant, employees with more education and experience might be expected to be more valuable and less likely to be displaced. The fact that managers in this sample have more education and more experience than other workers may lower their probability of being displaced, so I controlled for those characteristics. The square of experience was included to measure the effect of additional experience on the probability of displacement. Ideally, I would

have included respondents' tenures with their current employers, but that information was only available for the displaced respondents. The tenure of the displaced declined from 6.8 years in 1980 to 4.6 in 1986, perhaps because early retirement incentive programs removed senior employees first.

The data also report job earnings. If wages are proportional to contributions to an organization, there is no reason to expect a relationship between wages and displacement probabilities. High wages may, however, identify employees at the tops of organizations who are in a position to spare their own jobs. I also included variables identifying heads of households, which may indicate something about the hardship of displacement. Variables identifying respondents as women or minority group members may suggest whether displacement had a disproportionate effect on those protected groups. I expected that employers might have protected women and minorities in order to meet affirmative action guidelines. But to the extent that members of those groups had been recently hired, they might have been laid off first if seniority played a role in displacement decisions.

The industry in which a respondent was employed might also affect the probability of displacement by occupation. The percentage of the work force managers account for varies widely by industry; in 1982, the midpoint of the period considered here, managers accounted for less than 1 percent of the work force in agriculture and more than 17 percent in public service (*U.S. Bureau of Labor Statistics, 1989*). Industries also differ in the extent to which they experience the economic problems that drive layoffs. Perhaps managers have experienced less displacement simply because they are disproportionately concentrated in industries that have experienced less economic change. I included variables identifying industry, with manufacturing as the omitted category, to control for this possible effect.[4]

All of the above control variables were interacted with the management variable to identify whether the relationship between the variables and displacement differed for managers and members of other occupations. The arguments presented above concerning predictions for independent variables acting as controls also apply to the interaction terms. For example, if high education should be associated with a low probability of displacement, the interaction between the management and education variables should indicate whether managers experienced a lower probability of displacement than others. Table 3 gives means and standard deviations.

Given that displacement is an employer's decision, information about employers' characteristics and additional information about individual re-

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[4] It would clearly be useful to know whether employers used seniority-based systems to govern their layoffs. The Current Population Survey asked whether respondents were covered by a collective bargaining agreement, generally a good proxy for the presence of such seniority systems, but the 1983 data on this variable are so poor that they could not be used. A two-digit industry measure of collective bargaining coverage from the next Current Population Survey was calculated and included in the regression equations. It was not significant and had no effect on the other results. Such arrangements are unlikely to translate to management in any case. These results are available on request.

TABLE 3
Means and Standard Deviations

Variables	Means	s.d.
Experience	18.5	12.9
Experience squared	508	589
Years attended school	13.9	2.8
Member of protected minority group?[a]	.09	
Woman?[a]	.41	
Head of household?[a]	.63	
Manager?[a]	.01	
Weekly earnings in dollars	361	192
Employed in mining?[a]	.02	
Employed in construction?[a]	.09	
Employed in agriculture?[a]	.03	
Employed in a wholesale-retail trade, transportation, the postal service, etc.?[a]	.25	
Employed in a service industry?[a]	.15	
Employed in public administration?[a]	.18	
Employed in forestry and fisheries?[a]	.02	
Employed in manufacturing?[b]	.24	
Percent displaced by all causes	.07	
Percent displaced by plant closings	.03	
Percent displaced by slack work	.02	
Percent displaced by thinning	.01	

[a] 1 = yes, 0 = no.
[b] This was the omitted category.

spondents would have been helpful. That extra information was not available, however, and its lack led to omitted variables and errors in equations. But it is not obvious that any omitted variables would have been correlated with the management variable, the main concern here, and therefore there is no a priori reason to believe that the coefficients that result are biased. The intercept is biased, however, and the estimate of the variance-covariance matrix is overstated.

A bivariate "logit" equation in which 1 represented displacement in 1984 was used to examine the relationship between the probability of an individual being displaced and the variables.

RESULTS

Table 4 outlines the results of the regression analysis. With other characteristics controlled, being in a management job made an individual more likely to be displaced because of thinning than did being employed in other occupations (equation 4). This result supports Hypothesis 3 and arguments current in the business press that management has borne the brunt of streamlining efforts in organizations, even though there have also been extensive efforts to cut production jobs through restructuring work rules (Cappelli &

TABLE 4
Results of Regression Analysis[a]

Variables	Equation 1: All Causes	Equation 2: Plant Closing	Equation 3: Slack Work	Equation 4: Thinning
Constant	−4.27**	−3.12**	3.79†	−4.63*
	(5.97)	(3.51)	(1.45)	(2.14)
Experience	0.02E-01	0.02E-01	0.06E-01	0.12
	(0.52)	(0.34)	(1.07)	(0.95)
Experience squared	0.00-04	0.00-04	−0.00	0.00
	(0.02)	(0.08)	(−1.17)	(0.49)
Education	0.06-01†	0.04	−0.12**	−0.06
	(−1.39)	(0.48)	(−1.96)	(−0.50)
Minority group member?	−0.22	−0.51	0.30	−14.68
	(−0.44)	(1.04)	(0.53)	(−0.01)
Woman?	−0.61**	−0.02	−0.59	−0.86
	(1.87)	(−0.04)	(−1.24)	(−0.81)
Head of household?	−0.64*	−0.48	−0.21	−1.27
	(−2.07)	(−0.88)	(−0.46)	(1.02)
Manager?	1.51**	2.09**	−0.98	2.80**
	(3.42)	(3.28)	(−0.91)	(2.83)
Earnings	0.00	−0.00	0.00	0.00*
	(0.99)	(−0.25)	(0.23)	(2.31)
Mines	3.23**	3.98**	2.87**	−15.30
	(4.31)	(4.04)	(2.57)	(−0.00)
Construction	3.31**	3.22	2.27**	3.72**
	(7.46)	(0.81)	(2.92)	(3.00)
Agriculture	3.28**	3.21**	3.64**	−13.92
	(4.69)	(1.11)	(4.42)	(−0.00)
Trades	3.23**	3.00	2.13**	3.99**
	(10.96)	(0.53)	(4.08)	(4.71)
Service	2.83**	1.85*	3.59**	−14.69
	(6.92)	(2.11)	(7.68)	(−0.00)
Public administration	2.67*	−11.27	−11.70	−14.05
	(2.36)	(−0.01)	(−0.01)	(−0.00)
Forestry and fisheries	−10.37	−10.83	−11.81	−13.56
	(−0.01)	(−0.00)	(−0.00)	(0.00)
Logarithmic likelihood ratio	−335.58	−123.86	−183.29	−43.27
χ^2	11.63	9.64	10.42	7.54
p	.0001	.0001	.0001	.0001

[a] N = 4,374; t statistics are in parentheses.
  † $p < .10$, two-tailed test.
  * $p < .05$, two-tailed test.
  ** $p < .01$, two-tailed test.

McKersie, 1987). There was no significant difference between occupations in displacement rates from slack work (equation 3). Managers were more likely than other workers to be displaced from plant closings (equation 2), in contrast to predictions. This result suggests that a higher proportion of non-managers than managers must somehow be retained after facilities close. Union contracts sometimes provide explicit transfer rights for production

workers. If closings are driven by efforts to consolidate functions rather than efforts to reduce overall capacity, managerial jobs may be the ones eliminated.

Managers' disproportionate displacement as a result of plant closings helps make the overall relationship positive (equation 1): managers were significantly more likely to be displaced for all causes once individual and industry characteristics were controlled. This result is something of a surprise, given the summary figures in Table 1 indicating that overall, managers experienced a much lower rate of displacement than workers in blue-collar jobs and a slightly higher rate than workers in other white-collar jobs. Taken together, these two results suggest that being in a managerial job makes a person more likely to suffer displacement, although other characteristics associated with managers, such as high levels of education, may help offset displacement pressures.

Equation 1 also suggests that women and heads of households are significantly less likely to be displaced than men and non-heads of households, and that most of the industries experienced a greater probability of displacement than manufacturing, the omitted category. These relationships vary somewhat across the different causes of displacement. The industry variables' strength as predictors of displacement makes sense intuitively because product-market and firm-level factors drive displacement. Individual characteristics are only important in determining the distribution of that overall displacement level across individuals.

Equation 1 was also estimated by adding interaction variables to examine the effects of these independent variables within the management occupation. The results (available on request) suggest that managers were less likely to be displaced from mining and from retail and wholesale trade industries. Managers with much experience were also less likely to be displaced than others, although that effect diminished with additional experience. To the extent that experience is correlated with specific skills, this relationship may suggest that organizations are the most reluctant to let go of managers with the most specific skills. The relationships with experience do not exist across all occupations (equation 1), perhaps suggesting that experience produces more important specific skills for managers than for members of other occupations. Finally, high earnings increased the probability of displacement among managers. High-wage managers are generally in important positions, but they did not appear able to protect their own jobs.[5]

The 1984 data suggest that 75 percent of the managers surveyed were

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[5] Overall, the interaction terms did not add a statistically significant increment to the equation's predictive powers. Alternative specifications of the model had no effect on the management results. Separate equations for manufacturing employees, with various industries or race, education, or experience dropped from the equation, produced the same pattern of results. I computed fully interacted equations separately for each cause; the results are available on request. The plant closing results are virtually identical to the all-causes results reported here; equations for slack work and thinning had fewer significant relationships.

reemployed as of the survey date, and 9 percent had withdrawn from the labor force. In comparison, only 60 percent of all displaced workers had found reemployment, and 14 percent had withdrawn. By 1986, the reemployment rate for the managers was virtually the same as it had been (74 percent), but 12 percent now were out of the labor force, and the reemployment rate for all workers had risen to 67 percent.

The percentage of displaced managers unemployed for short periods (less than ten weeks) is about the same as it is for other white-collar workers but considerably higher than it is for blue-collar workers (16 percent versus 10 percent); the percentage of managers unemployed for long periods (over 90 weeks) is noticeably lower than it is for both other groups (managers, 7 percent, versus 10 percent for other white-collar and 13 percent for blue-collar). Kletzer (1987) offers a model of the duration of unemployment for displaced white-collar workers, including managers. Perhaps managers have better search strategies for finding new jobs than do other workers; alternatively, perhaps blue-collar workers in particular delay search in order to retain recall rights at their previous jobs. Displaced managers were slightly less likely than others to receive unemployment benefits; 46 percent received them, versus 48 percent of other white-collar and 56 percent of blue-collar workers. Perhaps more managers found new jobs before they became eligible to receive benefits or left the work force altogether; managers may also have had more accrued vacation pay and related compensation to exhaust before they could receive benefits.

Almost 68 percent of the displaced managers who found jobs reported an increase in weekly earnings (figures were not adjusted for inflation). But by way of comparison, 75 percent of the other white-collar and 72 percent of the blue-collar displaced workers reported income gains. In general, managers seemed slightly less likely than other displaced workers to secure big gains from reemployment and slightly more likely to suffer big losses.[6]

CONCLUSIONS

The results of this study suggest that the popular image of managers as a group protected from the displacements associated with economic and organizational change is false, at least for the early 1980s. With certain personal and industry characteristics controlled, people in management jobs faced a greater probability of being displaced than did other employees.

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[6] For example, 7 percent of managers reported reemployment income losses of over $250 per week, but only 2 percent of other white-collar workers and 3 percent of blue-collar workers reported such losses. The percentages for those reporting an income gain of over $250 are 43, 47, and 51, respectively. A study conducted for the U.S. Department of Labor using the 1984 data found that within the white-collar population (including managers), reemployment earnings were significantly higher for men but were not significantly different for women (Podgursky & Swaim, 1987).

Managers were more vulnerable to displacement from both plant closings and efforts to streamline, both of which are central to the restructuring of organizations.

The high recent insecurity of managerial employment may cause a number of problems for organizations, one of which might be difficulty in getting managers to establish commitment to their organizations. Business Week found that 65 percent of managers surveyed in 1986 believed that there is less loyalty to corporations now than there was in the past, a development that some ascribed to decreased job security (Business Week, 1936). A lack of employment security may cause managers to tailor their careers more to the outside market than to specific organizations and to become less interested in making investments in their organizations, such as developing skills that are unique to them. These developments may force firms and society to pay more attention to the phenomenon of displaced managers.

REFERENCES

Addison, J. T., & Portugal, P. 1987. The effect of advance notification of plant closings on unemployment. *Industrial and Labor Relations Review*, 41: 3–16.

Allison, P. D. 1984. Discrete-time methods for the analysis of event histories. In S. Leinhardt (Ed.), *Sociological methodology:* 61–98. San Francisco: Jossey-Bass.

Business Week. 1983. Business Week-Harris poll: Middle managers still think positively. April 25: 64.

Business Week. 1986. The end of corporate loyalty. August 4: 42–49.

Cappelli, P., & McKersie, R. B. 1987. Management strategies and the redesign of jobs. *Journal of Management Studies*, 24: 441–462.

Dopkowski, R. 1980. *Practical limitations on using CPS as a longitudinal data base.* Report no. 806, Washington, DC: Government Printing Office; U.S. Bureau of Labor Statistics.

Flaim, P. O., & Seghal, E. 1985. Displaced workers of 1979–83: How well have they fared? *Monthly Labor Review*, 108(16): 3–15.

Fortune. 1985. Management layoffs won't quit. October 28: 46–49.

Freedman, A. 1985. *The new look in wage policy and employee relations.* New York: Conference Board.

General Accounting Office. 1986. *Preliminary analysis of U.S. business closures and permanent layoffs during 1983 and 1984.* Washington, DC: General Accounting Office.

Horvath, F. W. 1987. The pulse of economic change: Displaced workers of 1981–1985. *Monthly Labor Review*, 110(6): 3–12.

Kanter, R. M. 1986. The reshaping of middle management. *Management Review*, 75: 19–20.

Klein, J. A. 1988. *The changing role of first-line supervision and middle managers.* Report no. 126, Washington, DC: U.S. Department of Labor, Bureau of Labor Relations and Cooperative Programs.

Kletzer, L. G. 1987. *Determinants of re-employment probabilities of displaced workers.* Working paper, Department of Economics, Williams College, Williamstown. MA.

Leavitt, H. J., & Whisler, T. L. 1958. Management in the 1980s. *Harvard Business Review*, 36(6): 41–48.

Levine, H. 1986. The squeeze on middle management. *Personnel*, 63(1): 62–69.

Osterman, P. 1986. The impact of computers on the employment of clerks and managers. *Industrial and Labor Relations Review*, 39: 175–186.

Pfeffer, J., & Cohen, Y. 1984. Determinants of internal labor markets in organizations. *Administrative Science Quarterly*, 29: 550–572.

Podgursky, M., & Swaim, P. 1987. *Labor market adjustment and job displacement.* Report to the Bureau of International Labor Affairs. Washington, DC: U.S. Department of Labor.

San Francisco Chronicle. 1989. IBM to fire twice as many of its poor performers. December 8: C4.

Smith, V. 1988. Restructuring management and managing restructuring: The role of managers in corporate change. *Research in Politics and Society*, 3: 221–239.

U.S. Bureau of Labor Statistics. 1989. *Handbook of labor statistics.* Washington, DC: U.S. Bureau of Labor Statistics.

Wall Street Journal. 1986. Merged firms often fire workers the easy way—not the best way. February 24: 1.

Wall Street Journal. 1990. White-collar layoffs open 1990, and may close it, too. January 15: B1.

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DECISION-MAKING PARTICIPATION PATTERNS: THE ROLE OF ORGANIZATIONAL CONTEXT

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Patterns of employees' participation in a number of specific decisions
were studied in 101 Oregon nursing homes. The inquiry concerned
whether such patterns vary according to the contextual properties of
facility size, skill level, and profit-making orientation. Although inter-
action effects varied, main-effect results were strong.

Contingency analysis provides a useful way to think about organiza-
tions. Originally emphasizing environmental characteristics, the perspective
is guided by the hypothesis that organizations whose internal features best
match the demands of their context will achieve the best adaptation (Scott,
1987: 88). Context generally refers to environment, technology, size, and
ownership (Daft, 1989; Pugh, Hickson, Hinings, & Turner, 1969; Scott, 1987).

Several studies have focused their contingency analysis on the relation-
ship between context and decision making. Duncan (1972) found relation-
ships among environmental characteristics, perceived uncertainty, and or-
ganizational decision making. Meyer and Brown (1977) found that certain
external factors, such as the development of governmental regulations, af-
fected the organizational form that evolved for the agencies affected by those
regulations. Salancik, Pfeffer, and Kelley (1978) showed that participation,
measured in terms of "source of influence," varied across decisions as a
function of a participant's ability to reduce organizational uncertainty. And
Mintzberg and McHugh (1985) identified unplanned yet discernible patterns
in Canada's National Film Board's decisions, strategies, and patterns of re-
sponse to its changing environment. Extensive reviews by Locke and Sch-
weiger (1979) and by Miller and Monge (1986) also address the relationship
between context and decision making.

The research reported here was also guided by the contingency perspec-
tive. Its purpose was to examine whether a particular internal variable, de-
cision making, varied systematically with organizational context. Specifi-
cally, I investigated whether patterns of employee participation were dis-
cernible as a function of an organization's size, overall technical complexity,
and profit-making orientation.

Oregon nursing homes served as the population for this study. Operating within a single state, the facilities studied shared many environmental elements, particularly those related to political and regulatory forces. Those factors therefore can be thought to be relatively constant across the facilities, thus allowing a rigorous examination of specific contextual factors in which variation did occur.

DECISION MAKING AND PARTICIPATION

At an organizational level of analysis, decision making has frequently been described in terms of degree of centralization or decentralization (Scott, 1987). For Hage and Aiken (1970: 38), centralization-decentralization was defined by the proportion of jobs and occupations whose incumbents participate in decisions and the proportion of decision areas they participate in. Agersnap and Dreisler defined *democratization* as "a high level of influence and participation by workers on decision making" (1982: 1). Following these ideas, I defined *participation* as meaning that an individual who is affected by decisions influences the making of those decisions (cf. Connor & Lake, 1988: 36; Cotton, Vollrath, Froggatt, Lengnick-Hall, & Jennings, 1988; Melcher, 1976; Salancik et al., 1978; Shetzer, 1991; Taylor, 1984: 198–199).

Notwithstanding the cited ideas, researchers have frequently treated the distribution of decision making as a unidimensional concept. In Tannenbaum and Schmidt's (1958) formulation, organizations are "democratic" or "autocratic." This simplistic view is questionable. Variation in organizational-structural conditions, in situation-specific circumstances, such as the nature of a given decision, and in the functional characteristics of a particular decision (for example, whether it concerns production or personnel) may influence not only the degree but also the nature of participation and its impact.

These considerations suggest that it may be useful to examine the distribution of participation in decisions, rather than merely the degree to which an organization is centralized. Collapsing something as complex as decision making into a single index may hide as much, if not more, information as it reveals. I followed the view of Cullen and Perrewe (1982: 101): "Decision making can be conceptualized as types of configurations rather than a linear centralization/decentralization phenomenon." Although Cullen and Perrewe used the term *configuration* to denote vertical relationships, I used *patterns*, conceived as including both horizontal and vertical relationships.

To illustrate decision patterns, Table 1 shows a simple matrix model representing participation in decision making in a medical setting. The first participation pattern, row a (hire-fire), is clearly highly autocratic: Only the organization's senior administrators participate in this decision. At the highly democratic extreme is the decision shown by row n (work scheduling), in which an incumbent of each organizational position takes part. Rows

TABLE 1
Illustrated Decision Matrix for a Medical Setting[a]

						Positions						
Decisions	Chief Administrator	Director of Nursing	Nutri- tionist	Accountant	Director of Food Services	Thera- pist	Psychol- ogist	Physi- cian	Director of Recreation	Patient	Registered Nurse	Custodian
a. Hire-fire	1	1	0	0	0	0	0	0	0	0	0	—	0
b. Meal service													
c. Medical services	0	1	0	0	0	0	1	1	0	0	1	—	0
d. Drug therapy													
e. Sanitation													
f. Financing	1	1	0	0	1	0	0	0	0	0	0	—	0
g. Safety													
h. Patient comfort													
⋮													
n. Work scheduling	1	1	1	1	1	1	1	1	1	1	1	—	1

[a] 1 = participation, 0 = no participation.

c (medical services) and f (financing), however, are less clear. The simple distinction between autocratic and democratic decisions does little to differentiate these two patterns.

Moreover, the observed differences between the patterns suggest that several factors may underlie participation. Such elements may include task, position, seniority, and other variables. At an organizational level, size, technology, environment, and goals are important (Daft, 1989: 17–20). Following this line of reasoning, I addressed the research question, Do decision patterns vary systematically across nursing homes as a function of their size, the level of health care they offer, and their orientation toward making a profit?

Although the traditional bureaucratic model seems to associate organizational size with centralized decision making (Hage, 1965), studies by Blau and Schoenherr (1971) and the Aston group (Pugh et al., 1969) have indicated that the opposite may be true. Scott (1987: 239) concluded from the latter findings that a large scale in organizations "supports the exercise of relatively greater independence and discretion" (cf. Huber, Miller, & Glick, 1990). Similarly, Daft (1989: 185–186) summarized the relationship between size and centralization as fundamentally negative. Thus,

> *Hypothesis 1: The larger a nursing home, the greater the degree of decision-making participation in it.*

Nursing homes offer varying levels of health care; some only admit patients requiring minimal care and others offer a variety of advanced medical, psychological, and physical therapy programs. The level of care it provides can be called a nursing home's *skill level*. On the presumption that higher skill levels involve greater complexity, with its attendant higher degree of specialization and variety of coordination needs, the second hypothesis is that as skill level increases, centralization decreases (Gibson, Ivancevich, & Donnelly, 1988: 448–450; Mintzberg, 1983: 139–140).

> *Hypothesis 2: The higher the level of health care a nursing home is licensed to offer, the greater the degree of decision-making participation in it.*

Finally, I studied both for-profit and not-for-profit facilities. In his classic discussion of future organizational structures, Simon (1960: 35) argued that the profit motive is an important pressure for decentralization in business organizations because managements seek to have even low-level employees take responsibility for profit making. To the contrary, however, Mahoney's (1967) study of 84 managers in 13 organizations found that they perceived strong supervisory control rather than democratic leadership as associated with organizational effectiveness. In a similar vein, 500 vice presidents in 125 large firms perceived corporate profits as positively associated with centralized decision making (Stagner, 1969). And Vroom and Jago

(1988: 97) reported that Robert and Vroom found the degree of participation to be lower in private-sector organizations than in public settings. Thus,

> *Hypothesis 3: The degree of decision-making participation is greater in not-for-profit nursing homes than in for-profit facilities.*

METHODS

Procedures and Data

While conducting three separate executive development conferences for nursing home administrators, I interviewed 75 administrators on two matters of relevance for this study. First, I asked them if there were types of decisions that tended to occur in all nursing homes, regardless of size, skill level, or profit-making orientation. Second, were there positions, hierarchical or otherwise, that existed in all facilities, also regardless of size and so forth? The interviewees answered each question in the affirmative, producing a list of decisions and a list of positions. I showed these lists to 10 different administrators, who verified their appropriateness.

Next, a questionnaire was constructed that essentially asked to what degree each position's incumbents influenced each type of decisions. To check the questionnaire's readability and pertinence, I asked 12 additional nursing home administrators to complete it and offer comments.

The final survey instrument was mailed to the administrator of each of the 171 nursing homes licensed in the State of Oregon, excluding 6 mental-retardation facilities and the 12 facilities used in the pilot phase. I made follow-up telephone calls to all nonrespondents. Usable responses were obtained from the administrators of 101 organizations, for a return rate of 59.1 percent.

Measures

Context. Since, as noted earlier, nursing homes in the same state share many broad environmental characteristics, their differences tend to lie along such dimensions as size, skill level, and profit-making orientation.

Size was measured as number of beds. The range for this study was from 12 to 200 ($\bar{x} = 85.5$, median $= 83.3$, s.d. $= 39.9$). The number of full-time equivalent (FTE) staff members can also be used as a measure of size; that number ranged from 7 to 160 ($\bar{x} = 56.7$, median $= 53.5$, s.d $= 30.4$). Number of FTE staff members and number of beds correlated strongly ($r = 0.89$, $p < .001$), however, and the measures produced identical results in subsequent analyses. I thus retained number of beds owing to its common use in medical care institutions as a size measure.

Skill level was described above as indicating the level of health care a facility is licensed to offer. Briefly, an intermediate care facility admits patients that require minimal care, whereas a skilled nursing facility offers a wide variety of care programs. A combination facility offers both intermediate and skilled care.

Nursing homes are structured as either for-profit or not-for-profit organizations. For-profit homes are either owned by people in the communities in which they are located or are parts of regional or national chains. Not-for-profit facilities are either owned by religious organizations (the Roman Catholic Church, for example) or by fraternal organizations (such as the Independent Order of Odd Fellows).

Participation. Each respondent was asked to rate the degree of participation of incumbents in each of the 11 positions in each of nine types of decisions. Rating was on a seven-point scale ranging from "no influence" to "complete influence."[1]

Decisions. The nine types of decisions were as follows:

Financial decisions concerned setting rates for care, allocating department or other operating area budgets, and handling investments, billing, receivables, and other financial control functions.

General management decisions concerned nursing home policy (on patient rules and regulations, admission criteria, and so forth), material and human resource allocation, supervisory details (work schedules, work loads), setting of goals, measurement, and control.

Housekeeping decisions concerned scheduling of workers, hiring of housekeeping employees, development of housekeeping standards, and handling housekeeping complaints.

Maintenance decisions concerned assigning task priorities, deciding which employees would work on which tasks, and scheduling long and short tasks.

Patient care decisions concerned development of care standards, the care performed, scheduling care, and priority for care among patients.

Personnel decisions concerned hiring employees, setting guidelines for employee discipline, writing job descriptions, and developing employee training programs or activities.

Public relations decisions concerned amounts and types of advertising, maintaining and improving a facility's public image, and miscellaneous expenditures of financial and human resources to improve public relations with local communities.

Purchase of equipment and supplies concerned review and replacement of old equipment, adding new equipment, and choosing vendors and supplies.

Purchasing and stocking food concerned developing and maintaining

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[1] The term *influence* is consistent with the definition of participation offered above. Also, respondents in the interview and pilot-test stages of this research were unanimous in their view that influence conveyed the idea of participation level better than the more ambiguous (to them) term, *participation*. Similarly, they were clear in their preference for seven levels rather than the five used in some other studies (e.g., Agersnap & Dreisler, 1982; Nathanson & Morlock, 1980); Cullen and Perrewe's (1981) study of decision-making configurations also employed a seven-point scale.

food standards, food preparation, vendor selection, and determination of food inventories.

Positions. The 11 positions studied were accountant, administrator, activities director—social services designee,[2] director of nursing, executive-owner, food services supervisor, housekeeper, licensed practical nurse, medical director, maintenance director, and registered nurse. State or federal laws mandate that nursing homes have many of these positions, including administrator, activities director—social services designee, director of nursing, and medical director. At least two positions—administrator and director of nursing—cannot be filled by the same person. Finally, the medical director is a physician who is typically not a full-time employee of a nursing home but is present periodically to provide medical care and advice.

RESULTS

The research question, Do decision patterns vary systematically by facility size, skill level, and profit orientation?, was explored by testing a linear model of the relationships among participation, decision, position, and the contextual variables of size, skill level, and orientation. Relationships among the contextual variables themselves as determined by chi-square tests should first be noted: size and skill level are positively related, with orientation controlled ($\chi^2 = 6.99$, $p < .01$, not-for-profit; $\chi^2 = 8.50$, $p < .01$, for-profit), and no other pairwise comparison permits rejection of the chi-square test for independence at the .10 level.

Table 2 shows the results of testing a linear multivariate model. The conclusion immediately apparent from the table is that the main effects of size, skill level, and profit orientation are strong, but weak third-order interactions are confounded by strong fourth-order effects.[3] Tables 3 and 4 present a sequential examination of these findings. First, the mean participation levels for all positions, taking each organizational property into account, was computed. Table 3 shows the results of this computation.

It is apparent from Table 3 that the results clearly support Hypotheses 1 and 2 but offer mixed support for Hypothesis 3: the distribution of participation in each decision increased with facility size and skill level but did not vary so clearly with profit-making orientation.

Source of Variation

To say that an organizational property has a strong impact on a decision pattern is to say that the participation levels of organizational positions vary

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[2] A social services designee is an employee formally designated as responsible for providing social services within a facility.

[3] Nine decision types and 11 positions across 101 organizations yielded 9,999 observations, a figure that proved unmanageable for calculating fourth- and fifth-order interactions; such calculations would involve almost doubling the model's degrees of freedom. The two key fourth-order relationships are, however, shown.

TABLE 2
Results of Analysis of Variance for a General Linear Model

Variables	df	F	p
Position	10	217.26	.001
Decision	8	21.57	.001
Skill level	1	22.90	.001
Size	1	82.43	.001
Ownership	1	15.90	.001
Position × decision	80	33.02	.001
Position × skill level	10	3.31	.001
Position × size	10	2.64	.001
Position × ownership	10	4.23	.001
Decision × skill level	8	2.32	.05
Decision × size	8	1.52	n.s.
Decision × ownership	8	1.65	n.s.
Position × decision × skill level	80	1.50	.01
Position × decision × size	80	0.73	n.s.
Position × decision × ownership	80	0.71	n.s.
Position × ownership × skill level × size	40	2.94	.001
Decision × ownership × skill level × size	32	2.66	.001

systematically according to that property. For example, Table 3 indicates that participation in financial decisions varies as a function of size. The question naturally arises as to what the source of this variation is. Depending on whether an organization is small or large, does participation level differ for all positions, some positions, or just one position? And does it vary for the same position or positions in the case of all decisions?

Table 4 answers those questions, comparing the average participation levels for each position, in each decision, by each organizational property. The table leads to two conclusions. First, despite the significant main effect shown in Table 2, variation in decision patterns by profit-making orientation is limited. Table 3 indicates that ownership has an effect on only three types of decision: general management, personnel, and purchasing equipment and supplies; Table 4 shows that these effects stem from the housekeeper position in all three decision types and also stem from the maintenance director position in purchasing equipment and supplies decisions.

Second, variations in decision patterns that occur with either size or skill level seem to stem from virtually all positions. Each of the three top manager positions, administrator, director of nursing, and executive-owner, has about the same participation level in a given decision, regardless of an organization's size and designated level of health care.

DISCUSSION

Conceptual Issues

The principal conceptual issue is a test of the contingency perspective on organizations. This study indicates that certain contextual properties are

TABLE 3
Mean Decision Participation Levels

Decisions	Size[a]		Skill Level		Orientation	
	Small	Large	Intermediate	Skilled or Combination	Not-for-Profit	For-Profit
Financial	1.37	1.83***	1.40	1.97***	1.64	1.59
General management	1.75	2.24***	1.75	2.47***	2.23	1.93*
Housekeeping	1.47	1.72*	1.50	1.77*	1.52	1.62
Maintenance	1.36	1.59*	1.38	1.66*	1.44	1.49
Patient care	1.96	2.31**	1.94	2.51***	2.20	2.12
Personnel	1.64	2.25***	1.68	2.45***	2.19	1.87*
Public relations	1.50	1.97***	1.54	2.11***	1.75	1.73
Purchasing equipment and supplies	1.78	2.38***	1.81	2.59***	2.30	2.02*
Purchasing and stocking food	1.28	1.60**	1.33	1.64*	1.41	1.45
N	50	51	66	35	24	77

[a] Facilities were divided at the median number of beds (83.3).
* $p < .05$, one-tailed test.
** $p < .01$, one-tailed test.
*** $p < .001$, one-tailed test.

indeed related to internal organizational variables—in this case, to decision patterns. For the organizations in this study, incumbents of various positions clearly have different levels of participation in various decisions; these differences are related especially to organizational size and skill level and are somewhat related to type of profit-making orientation.

This research extends the contingency perspective, in fact. This study differentiated the distribution of decision participation by organizational level, with the data indicating that in the relationship between decision patterns and the contextual properties there are differences toward the middle and bottom levels of organizations.

I conclude from this pattern that it would be wise to emulate the study of technology: organizational researchers have learned to examine technology in various subunits and at various hierarchical levels, rather than be limited to using one technological type to characterize a complete organization (Scott, 1987: 224–226). So too should researchers investigate relationships between context and internal processes.

The second conceptual issue concerns a pair of contrasting bits of conventional wisdom. Put roughly, one maxim is that small and technically simple organizations provide members with much greater opportunity for both social and task interaction than do large, complex organizations. In smaller, simpler facilities one therefore would expect to find more member involvement in all sorts of organizational activities, including decision making.

TABLE 4
Mean Decision Participation Levels for Each Position[a]

Decision-Position	Size[b]		Skill Level		Orientation	
	Small	Large	Intermediate	Skilled or Combination	Not-for-Profit	For-Profit
Financial						
Accountant	2.06	3.51***	2.46	3.39*	2.91	2.76
Administrator	4.46	4.53	4.26	4.92*	4.70	4.44
Activities director	0.48	0.82	0.48	0.97*	0.87	0.59
Director of nursing	1.74	2.00	1.60	2.36*	1.56	1.85
Food services supervisor	0.88	1.47*	0.92	1.64*	1.35	1.13
Housekeeper	0.34	0.76*	0.43	0.78	1.00	0.42
Medical director	0.30	0.67	0.18	1.06**	0.42	0.51
Maintenance director	0.44	1.24**	0.62	1.26	1.00	0.79
General management						
Accountant	0.74	1.57**	0.80	1.83*	1.63	1.01
Activities director	1.50	1.82	1.36	2.23**	1.75	1.64
Executive-owner	2.42	3.25*	2.76	3.00	2.46	2.96
Food services supervisor	0.46	1.51***	0.58	1.77***	1.54	0.82
Housekeeper	0.84	1.49*	0.97	1.54*	1.92	0.94**
L.P.N.	1.00	1.23	0.88	1.57**	1.29	1.06
Maintenance director	0.80	1.59**	0.94	1.69*	1.71	1.04
Housekeeping						
Accountant	0.18	0.65*	0.26	0.71	0.71	0.32
Administrator	4.62	4.35	4.70	4.09	3.67	4.74**
Activities director	0.16	0.57**	0.29	0.51	0.46	0.34
Food services supervisor	0.38	0.94**	0.59	0.80	0.75	0.64
Housekeeper	3.30	4.22**	3.39	4.46***	4.75	3.45***
Medical director	0.20	0.53*	0.17	0.74**	0.25	0.40
Maintenance						
Accountant	0.22	0.98**	0.42	0.94	0.71	0.57
Administrator	4.48	4.24	4.41	4.26	3.63	4.58*
Activities director	0.18	0.53*	0.26	0.54	0.33	0.36
Food services supervisor	0.42	1.06**	0.58	1.06*	0.75	0.74
Medical director	0.14	0.25	0.11	0.37*	0.21	0.19
Maintenance director	3.64	4.25	3.60	4.60**	4.54	3.77*
Patient care						
Activities director	1.50	2.18*	1.64	2.23	1.96	1.81
Food services supervisor	1.06	1.43	1.00	1.71*	1.54	1.16
L.P.N.	2.34	3.06*	2.42	3.23**	2.88	2.65
Medical director	1.96	2.49	1.42	3.74***	2.17	2.25
Maintenance director	0.34	0.67*	0.30	0.89**	0.54	0.49
R.N.	3.12	3.61	3.15	3.77*	3.79	3.23
Personnel						
Accountant	0.40	0.98*	0.42	1.20*	1.13	0.56
Activities director	0.64	1.51**	0.79	1.63**	1.25	1.03
Food services supervisor	1.80	3.00**	1.88	3.40***	3.00	2.22
Housekeeper	1.18	2.22**	1.26	2.54***	2.63	1.42**
L.P.N.	0.74	1.11	0.63	1.40**	1.17	0.86
Medical director	0.36	0.86*	0.23	1.34***	0.58	0.62
Maintenance director	1.04	2.20**	1.20	2.43**	2.25	1.43
R.N.	0.94	1.51*	0.83	1.97***	1.42	1.17
Public relations						
Accountant	0.66	1.72**	1.00	1.57	1.04	1.25
Activities director	1.92	2.29	1.68	2.91***	1.96	2.16
Director of nursing	2.32	2.73	2.17	3.20**	2.21	2.62
Food services supervisor	0.64	1.33**	0.70	1.54**	1.33	0.88
Medical director	0.58	0.98	0.45	1.40**	0.75	0.79
Maintenance director	0.50	1.02*	0.64	1.00	0.96	0.70

TABLE 4 (continued)

Decision-Position	Size[b]		Skill Level		Orientation	
	Small	Large	Intermediate	Skilled or Combination	Not-for-Profit	For-Profit
Purchasing equipment and supplies						
Accountant	1.04	2.17**	1.30	2.20*	1.42	1.68
Activities director	0.18	1.43**	0.83	1.66**	1.33	1.05
Director of nursing	2.88	3.39	2.82	3.74***	3.50	3.03
Food services supervisor	1.76	2.67**	1.83	2.94***	2.71	2.06
Housekeeper	1.40	1.96	1.26	2.49***	2.54	1.42**
L.P.N.	0.70	1.12	0.62	1.31	1.00	0.82
Medical director	0.32	0.90**	0.27	1.16***	0.79	0.56
Maintenance director	1.76	2.92***	1.97	3.06**	2.83	2.18*
R.N.	1.00	1.25	0.82	1.71***	1.33	1.05
Purchasing and stocking food						
Accountant	0.42	1.20**	0.70	1.03	0.83	0.81
Activities director	0.22	0.75**	0.30	0.83*	0.83	0.36*
Director of nursing	1.44	1.73	1.27	2.17**	1.63	1.57
Executive-owner	1.50	2.29	2.17	1.40	1.03	2.16*
Food services supervisor	4.58	4.94	4.62	5.03*	5.21	4.62**
Medical director	0.34	0.86*	0.21	1.32***	0.75	0.56
N	50	51	66	35	24	77

[a] Only positions whose pairwise differences are significant at the 0.05 level or higher are reported.
[b] Facilities were divided at the median number of beds (83.3).
* $p < .05$, one-tailed test.
** $p < .01$, one-tailed test.
*** $p < .001$, one-tailed test.

As with much conventional wisdom, however, the inverse of the maxim above is also widely accepted: small, simple organizations are amenable to being managed in a centralized fashion. According to this view, it should not be difficult for one manager to supervise an organization's people and processes if the people are few and the processes are simple. Conversely, in this view large, technically complex organizations are much less easily managed in a centralized fashion. Therefore, one would expect to see decision-making participation to be generally greater and more extensively distributed in large organizations.

Both expectations have an intuitive appeal, which doubtless is why they conventionally seem to be wise. However, this research supports the first maxim rather than the second.

The third issue concerns the negligible effect of for-profit or not-for-profit orientation on participation. Why do for-profit facilities enjoy approximately the same levels of participation as their not-for-profit counterparts? No clear explanation suggests itself. My best guess lies in the numbers reported in Table 4. In virtually every case, the level of participation is higher in the not-for-profits, although not to a statistically significantly degree. This pattern is consistent with Hypothesis 3; when it is broken, it is primarily by

the director of nursing services and medical director positions, and occasionally by the executive-owner and administrator positions. Perhaps each of these senior positions takes on special importance in for-profit facilities. Investigation of the decision-making dynamics—examining each participant's decision roles and responsibilities (McCann & Gilmore, 1983) for each type of organization—would be useful for testing that possibility.

Finally, the contextual property of facility skill level raises an important issue. It may be a useful surrogate for a more theoretically interesting variable: technology, or more specifically, technological complexity. The skilled nursing facilities studied here offered a relatively high level of care, involving specialists, a variety of physical, social, and psychological therapy programs, special equipment, and so forth. This profile is consistent with the idea that technologically complex organizations acquire inputs that are varied, unpredictable, and nonuniform and produce outputs that are multiple and diverse, with both processes involving a high degree of interdependence between the technical elements (Perrow, 1967, 1970; Scott, 1987: 211–214). Indeed, virtually any definition of technological complexity would include the kinds of dimensions that distinguish skilled nursing facilities from intermediate care institutions. If skill level and technological complexity can indeed be equated, this research has contributed to the argument that both size and technology are key variables in their relation to other organizational properties.

Methodological Issues

This research raises two methodological issues. The first concerns the problem of relying on a single respondent for each organization, even one presumably as knowledgeable as the administrator. The major difficulty with this practice is that an individual may give a biased response for either personal or role-related reasons.

However, there is some evidence that this problem may not be important with regard to perceived participation in decisions. Smith, Discenza, and Saxberg (1978), for instance, reported mixed results: they found that although nursing home administrators, nursing directors, and dietary supervisors were split in their perceptions of participation for some decisions, their perceptions were highly congruent with respect to others. And Salancik and colleagues (1978: 144) reported that people could "discriminate reliably among persons in terms of their relative influence" in equipment purchase decisions.

As in the cited studies, the single-respondent danger does not seem to have materialized in this research. To find evidence of bias, one would have to conclude that administrators of similar institutions share a common response bias about who participates how much in what decisions, and that the six response biases (three contextual variables, dichotomized) are all significantly different from each other. The possibility that all these different biases exist—and that therefore the results of significant differences are merely artifacts of those biases—strains credulity.

The final issue highlighted by this research regards the use of a decision-position matrix. One concern underlying the study was that too much information is lost when data are collapsed into a single index. This research was therefore instructive because it confirmed the feasibility of examining organizational variables in their multidimensional state. Since organizational variables are usually conceived of as multidimensional, this may be an especially useful illustration. Such techniques therefore have strong potential for increasing academic understanding of organizational properties, processes, and their relationships.

REFERENCES

Agersnap, F., & Dreisler, P. 1982. *Is delegation a condition for democratization?* Copenhagen: Institute of Organization and Industrial Sociology, Copenhagen School of Economics and Social Science.

Blau, P. M., & Schoenherr, R. A. 1971. *The structure of organizations.* New York: Basic Books.

Connor, P. E., & Lake, L. L. 1988. *Managing organizational change.* New York: Praeger.

Cotton, J. L., Vollrath, D. A., Froggatt, K. L., Lengnick-Hall, M. L., & Jennings, K. R. 1988. Employee participation: Diverse forms and different outcomes. *Academy of Management Review,* 13: 8–22.

Cullen, J. B., & Perrewe, P. L. 1982. Decision making configurations: An alternative to the centralization/decentralization conceptualization. *Journal of Management,* 7: 89–103.

Daft, R. L. 1989. *Organization theory and design* (3d ed.). St. Paul: West.

Duncan, R. B. 1972. Characteristics of organizational environments and perceived environmental uncertainty. *Administrative Science Quarterly,* 17: 313–327.

Gibson, J. L., Ivancevich, J. M., & Donnelly, J. H., Jr. 1988. *Organizations* (6th ed.). Plano, TX: Business Publications.

Hage, J. 1965. An axiomatic theory of organizations. *Administrative Science Quarterly,* 10: 289–320.

Hage, J., & Aiken, M. 1970. *Social change in complex organizations.* New York: Random House.

Huber, G. P., Miller, C. C., & Glick, W. H. 1990. Developing more encompassing theories about organizations: The centralization-effectiveness relationship as an example. *Organization Science,* 1: 11–40.

Locke, E. A., & Schweiger, D. M. 1979. Participation in decision-making: One more look. In B. Staw (Ed.), *Research in organizational behavior,* vol. 1: 265–339. Greenwich, CT: JAI Press.

McCann, J. E., & Gilmore, T. N. 1983. Diagnosing organizational decision making through responsibility charting. *Sloan Management Review,* 24(2): 3–15.

Mahoney, T. A. 1967. Managerial perceptions of organizational effectiveness. *Management Science,* 14: 76–91.

Melcher, A. 1976. Participation: A critical review of research findings. *Human Resource Management,* 15: 12–21.

Meyer, M. S., & Brown, M. C. 1977. The process of bureaucratization. *American Journal of Sociology,* 83: 364–385.

Miller, K. I., & Monge, P. E. 1986. Participation, satisfaction, and productivity: A meta-analytic review. *Academy of Management Journal,* 29: 722–753.

Mintzberg, H. 1983. *Structure in fives: Designing effective organizations.* Englewood Cliffs, NJ: Prentice-Hall.

Mintzberg, H., & McHugh, A. 1985. Strategy formation in an adhocracy. *Administrative Science Quarterly,* 30: 160–197.

Nathanson, C. A., & Morlock, L. L. 1980. Control structure, values, and innovation: A comparative study of hospitals. *Journal of Health and Social Behavior,* 21: 315–333.

Perrow, C. 1967. A framework for the comparative analysis of organizations. *American Sociological Review,* 32: 194–208.

Perrow, C. 1970. *Organizational analysis: A sociological view.* Belmont, CA: Wadsworth.

Pugh, D. S., Hickson, D. J., Hinings, C. R., & Turner, C. 1969. The context of organizational structures. *Administrative Science Quarterly,* 14: 91–114.

Salancik, G., Pfeffer, J., & Kelley, J. 1978. A contingency model of influence in organizational decision making. *Pacific Sociological Review,* 21: 239–256.

Scott, W. R. 1987. *Organizations: Rational, natural, and open systems.* Englewood Cliffs, NJ: Prentice-Hall.

Shetzer, L. 1991. *A social information processing model of employee participation.* Working paper, Faculty of Commerce, University of British Columbia, Vancouver.

Simon, H. A. 1960. *The new science of management decision.* Englewood Cliffs, NJ: Prentice-Hall.

Smith, H. L., Discenza, R., & Saxberg, B. O. 1978. Administering long-term care services: A decision-making perspective. *Gerontologist,* 18: 159–166.

Stagner, R. 1969. Corporate decision making: An empirical study. *Journal of Applied Psychology,* 53: 1–13.

Tannenbaum, R., & Schmidt, W. H. 1958. How to choose a leadership pattern. *Harvard Business Review,* 36(2): 95–101.

Taylor, R. N. 1984. *Behavioral decision making.* Glenview, IL: Scott, Foresman.

Vroom, V. H., & Jago, A. 1988. *Managing participation in organizations.* Englewood Cliffs, NJ: Prentice-Hall.

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FOCI AND BASES OF COMMITMENT: ARE THEY DISTINCTIONS WORTH MAKING?

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This study examined the contribution of two concepts to the conventional view of commitment: foci of commitment, the individuals and groups to whom an employee is attached, and bases of commitment, the motives engendering attachment. Commitment to top management, supervisor, and work group were important determinants of job satisfaction, intent to quit, and prosocial organizational behaviors over and above commitment to an organization. Compliance, identification, and internalization as bases of commitment were unique determinants above and beyond commitment to the foci.

A reconceptualization of employee commitment has emerged within the literature on work-related attachments. Recent authors have argued that it is important to examine various foci and bases of commitment. Foci of commitment are the particular entities, such as individuals and groups, to whom an employee is attached (Reichers, 1985). Bases of commitment are the motives engendering attachment (O'Reilly & Chatman, 1986).

Reichers (1985) used organization theory to build the case that, before the foci of employee attachment can be specified, the various individuals and groups that are relevant to an organization must be specified. Reichers buttressed her argument with findings from research on reference groups and role theory indicating that many organization members are aware of and committed to multiple sets of goals and values. Reichers postulated a number of foci that may be relevant to many employees, including "co-workers, superiors, subordinates, customers, and other groups and individuals that collectively comprise the organization" (1985: 472); in later work, she demonstrated the relevance of some of those foci to organization members (Reichers, 1986). It should be noted that other researchers have recognized at least implicitly the multiple commitments that people may have. For example, in a resurgence of research on union commitment, investigators have studied how commitment to unions is related to commitment to employing organizations (Angle & Perry, 1986; Dalton & Todor, 1982). Such research

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has suggested that commitment may not be a zero-sum game; many employees have a high degree of commitment to both their employing organizations and unions.

O'Reilly and Chatman (1986) argued that commitment has multiple bases. According to Kelman (1958), compliance occurs when people adopt attitudes and behaviors in order to obtain specific rewards or to avoid specific punishments. Identification occurs when people adopt attitudes and behaviors in order to be associated with a satisfying, self-defining relationship with another person or group. Finally, internalization occurs when people adopt attitudes and behaviors because their content is congruent with the individuals' value systems. O'Reilly and Chatman (1986) found that compliance, identification, and internalization, viewed as bases of commitment, were differentially related to prosocial organizational behaviors (behaviors that are intended to promote the welfare of the organization or individuals and groups within the organization) and to turnover and intent to stay with an organization.

The concern for distinguishing the contributions of foci and bases of commitment contrasts markedly with the conventional view of commitment, which is that employee attachment involves "the relative strength of an individual's identification with and involvement in a particular organization" (Mowday, Porter, & Steers, 1982: 27). Commitment so defined has most often been measured via the Organizational Commitment Questionnaire (OCQ) developed by Porter, Steers, Mowday, and Boulian in 1974; congruent with the unidimensional view underlying the instrument, the OCQ assesses commitment along a single dimension (Cook, Hepworth, Wall, & Warr, 1981). In summary, the conventional approach, although the most widely used in both research and practice (Mathieu & Zajac, 1990), does not in theory or practice acknowledge the multiple commitments that employees may have, nor does it distinguish among motives for psychological attachment.

Theoretical and empirical studies have linked commitment to withdrawal phenomena such as absenteeism and intent to quit (Clegg, 1983; Cotton & Tuttle, 1986) and to job attitudes, especially job satisfaction (Mowday et al., 1982). Other work has supported the link of organizational commitment to prosocial organizational behavior (Brief & Motowidlo, 1986; Organ, 1988). Research has not supported a significant link between commitment, conventionally defined, and performance and other work outputs (Mathieu & Zajac, 1990; Randall, 1990).

The primary purpose of the current research was to determine whether or not the concepts of foci and bases of commitment add substantively to the conventional perspective. It has not been demonstrated that these concepts add anything to the understanding of the phenomenon of individuals' attachments to organizations beyond what is explained by the conventional view. This is an important issue because if the reconceptualization of commitment, with its complications in theory and measurement, does not more adequately tap employee attachment, the principle of parsimony would sug-

gest that the conventional perspective, with its simpler conceptualization and measurement, is preferable.

As discussed above, Reichers (1985) argued that top managers, supervisors, and co-workers are generally important foci for employees. This argument and the findings of research on organizational commitment led me to expect that people would identify their top management, supervisor, work group, and organization as relevant foci of commitment. The theory underlying the multiple commitments literature (Reichers, 1985) suggests that an individual's attitudinal commitment to a workplace cannot be adequately explained by commitment to the organization alone because the coalitional nature of organizations leads employee commitment to be multidimensional. If that is true, commitment to foci other than an organization should help explain variance in key dependent variables. Intent to quit, satisfaction, and prosocial organizational behaviors are central dependent variables in the commitment literature. Given the evidence that high levels cf commitment generally have positive implications for organizational outcomes (Mathieu & Zajac, 1990; Randall, 1990), strong commitment to any focus should be negatively related to the intent to quit and positively related to satisfaction and prosocial organizational behavior. Thus,

> *Hypothesis 1: Commitment to foci other than an employing organization, specifically to top management, supervisors, and work groups, will be negatively related to intent to quit and positively related to satisfaction and prosocial organizational behaviors and will explain variance in these dependent variables over and above that explained by commitment to the organization.*

The work of O'Reilly and Chatman (1986) and of Caldwell, Chatman, and O'Reilly (1990) has suggested that compliance, identification, and internalization are relevant bases of commitment. If, as the theory underlying the concept of bases of commitment suggests, they are an important dimension of employee attachment and can explain attachment above and beyond the level of overall commitment, bases of commitment should account for unique variance in key dependent variables. Also, the work of those authors has suggested that identification and internalization have positive implications for organizational outcomes, apparently because work-related norms and values accepted by employees have lasting effects. The same work has suggested that compliance has negative implications, apparently because this form of attachment is fleeting and does not involve acceptance of norms and values beneficial to an organization. Therefore,

> *Hypothesis 2: Identification and internalization will be negatively related to intent to quit and positively related to satisfaction and prosocial organizational behavior, and compliance will be positively related to intent to quit and negatively related to satisfaction and prosocial organizational behavior; the three bases of commitment (iden-*

> *tification, internalization, and compliance) will explain variance in these dependent variables over and above that explained by the foci of commitment.*

In summary, the current study is the first to directly examine the contributions of the foci and bases concepts to the conventional view of commitment and the first to incorporate assessments of both foci and bases within one investigation.

METHODS

Survey Methodology and Respondents

Searching for a field site for this research, I selected 30 organizations from an organizational directory for my local area. I sent the presidents of the first 30 organizations in the directory with 500 or more employees a letter of introduction. The letter provided an overview of the research and included a stamped, self-addressed postcard on which a president could indicate interest in hearing more about the research. Through this process, a military supply company and I mutually selected each other.

The company was composed of three divisions containing a total of 1,305 employees. In order to assess test-retest reliabilities and to reduce concerns about common method variance, I collected two waves of survey data from this pool of employees. For the first administration, I sent surveys to all 1,305 employees via the company's internal mail system, including a cover letter that briefly described the purpose of the study, assured the potential respondents of confidentiality, and provided instructions for the completion and return of the questionnaires. Completed surveys were delivered to the firm's mail room, where I retrieved them. Following a reminder memo, 763 usable surveys were returned, for a time 1 response rate of 58.5 percent.

For the second administration, initiated one month after the delivery of the follow-up memo for the first set of surveys, I mailed a second set to the 763 employees who had responded. The same procedure described for the first wave of data collection and the same survey were used. A total of 440 usable surveys were returned, for a time 2 response rate of 57.7 percent and an overall response rate of 33.7 percent. Respondents for whom complete data were available ranged in age from 20 to 70 years, with a mean of 41.5 years, and they ranged in education from 8 to over 16 years completed, with a mean of 13.7. The average employee had been with the company for 9.2 years. Women comprised 58.2 percent of the respondents.[1]

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[1] To examine the issue of nonresponse bias, I compared the demographic variables of age, education, tenure, and gender for time 1 and time 2 respondents. The two groups did not significantly differ with respect to any of these variables.

Measures

Foci of commitment. In order to identify meaningful foci within the company, individual interviews were conducted with 15 employees (five volunteers from each of the three divisions). Interviews included open-ended questions, such as "If I followed you around on a typical day, who would I see you talking to and working with?" and "What kinds of groups exist in this company?" and standardized, closed-ended queries like "Could you name your supervisor?" and "Do you know all the people in your work group?" The standardized questions were based in part on the work of Reichers (1985) and others who have identified certain foci as generally relevant. I also took the organizational structure and formal reporting relationships of the company into consideration.

On the basis of the frequency with which they appeared in transcripts of the taped interview, the following foci were selected for inclusion in the study: the organization, its top management, immediate supervisors, and immediate work groups. Commitment to the organization was measured via the OCQ (Mowday et al., 1982); because of criticisms that several OCQ items inflate concept redundancy between organizational commitment and intent to quit (Reichers, 1985: 469), I used two of the items normally included in the 15-item instrument as part of a measure of intent to quit instead; this measure is described below. To check the validity of this change, I conducted analyses with both the 13- and 15-item scales; results were essentially the same. Only results based on the 13-item scale are reported in this article. Commitment to the other foci was assessed by asking respondents, "How attached are you to the following people and groups?" (top management, supervisor, and work group). Responses were given on a seven-point scale ranging from "not at all" to "completely."

Bases of commitment. O'Reilly and Chatman's (1986) measure of the bases of commitment to an organization was used as a guide in writing items designed to assess the bases of commitment to each focus. I wrote an additional five items for each focus using a scale measuring social identification developed by Mael (Ashforth & Mael, 1989) as a guide. I added these items to the O'Reilly and Chatman measure because some research has indicated an inability of this measure to separate identification and internalization (Caldwell et al., 1990). I hoped that the additional items would promote a cleaner distinction between identification and internalization.

All in all, 17 items designed to assess compliance, identification, and internalization were written for each of the foci, including the organization. Responses were given on a seven-point scale ranging from "strongly disagree" to "strongly agree." Given the possibility that some respondents would indicate that they were "not at all" committed to certain foci, asking about the bases of commitment to these foci would be nonsensical; therefore, the escape option "not applicable" was supplied in the bases of commitment section. Via a series of factor analyses, I developed eight scales assessing the

bases of commitment. These were identification and internalization with respect to organization, supervisor, and work group; normative commitment to top management; and overall compliance, without regard to foci. Scale scores were computed by summing across items within scales. Complete information on scale development is available upon request.

Satisfaction. The 20-item version of the Minnesota Satisfaction Questionnaire (Weiss, Dawis, England, & Lofquist, 1967) was used to measure overall job satisfaction, intrinsic satisfaction, and extrinsic satisfaction. Responses were given on a seven-point scale ranging from "very dissatisfied" to "very satisfied." I computed scale scores by summing across items.

Intent to quit. Intent to leave the organization was measured in part by two items from the Michigan Organizational Assessment Questionnaire (Cammann, Fichman, Jenkins, & Klesh, 1979). They were "It is likely that I will actively look for a new job in the next year," and "I often think about quitting." I took two additional items from the OCQ: "It would take very little change in my present circumstances to cause me to leave this organization," and "There's not too much to be gained by sticking with the organization indefinitely." Responses were given on a seven-point scale ranging from "strongly disagree" to "strongly agree." Intent to quit was assessed by summing across the four items.

Prosocial organizational behaviors. A slightly revised version of the 15-item Smith, Organ, and Near (1983) instrument served as part of the measure of prosocial organizational behavior; following Brief and Motowidlo (1986), I conceptualized organizational citizenship behavior as a subset of prosocial organizational behaviors. In addition, I created 10 new items based upon group interviews with employees. Creation of these items was a response to the call for additional development of measures of prosocial organizational behavior (Brief & Motowidlo, 1986), especially site-specific ones (Organ, 1988: 106–107). Responses to the 25 items were given on a five-point scale ranging from "never" to "always." Congruent with prior research (Williams, Podsakoff, & Huber, 1986), factor analyses suggested three types of prosocial organizational behavior: altruism, conscientiousness, and nonidleness, reverse-scored. I developed scales for each behavior and derived scale scores by summing across items; complete information on scale development is available upon request.

Respondents and their peers and supervisors provided ratings of prosocial organizational behavior. Over 95 percent of the respondents to both survey administrations supplied self-ratings. At least one other rating from a supervisor or peer was gathered for 80.2 percent of the respondents. I averaged values across raters to measure prosocial organizational behavior for each respondent. Research demonstrating that various sources of ratings, including self-assessments, are different but potentially valid measures of behavior supported the use of this method (Vance, MacCallum, Coovert, & Hedge, 1988).

Demographic variables. The opening section of the survey asked the

respondents for demographic information. The variables included were selected on the basis of prior research tying them to commitment phenomena. The variables and examples of research indicating their relevance are: age (Morrow & McElroy, 1987), education (Glisson & Durick, 1988), gender (Fry & Greenfeld, 1980), tenure in the company and current job (Luthans, Mc-Caul, Harriette, & Dodd, 1985), and organizational unit (Decotiis & Summers, 1987).

RESULTS

Table 1 contains the data set sizes, means, and standard deviations for all the variables. The table also presents coefficient alphas for the multi-item measures and coefficients of stability across questionnaire administrations for each measure. Table 2 shows the correlations among the variables.[2] Commitment to each of the foci is negatively correlated with intent to quit and positively correlated with satisfaction and prosocial organizational behavior, supporting the directional predictions of Hypothesis 1. Identification and internalization with respect to organization, supervisor, and work group are negatively correlated with intent to quit and positively correlated with satisfaction and prosocial organizational behavior; compliance is positively correlated with intent to quit and negatively correlated with satisfaction and prosocial organizational behavior. Those correlations support the directional predictions of Hypothesis 2.

Hypothesis 1 predicts that an employee's commitment to foci other than an organization will account for variance in the dependent variables over and above the variance accounted for by commitment to the organization. Hypothesis 2 predicts that the bases of commitment will account for variance in the dependent variables over and above variance accounted for by the foci. To test these predictions, I used hierarchical regression analysis.

First, I entered the demographic variables into the equation. The logic for entering these variables first was that they were not of central interest to this study and were, in fact, nuisance variables that needed to be controlled. Second, I added commitment to the organization. Since a central purpose of this study was to examine whether or not commitment to work-related foci

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[2] Although there is multicollinearity between the foci and bases of commitment measures, there also appears to be evidence for the discriminant validity of the two sets of variables. The mean across the 28 correlations of the foci and bases measures is .435, which leaves an average 81 percent of the variance in the foci and bases unaccounted for by their intercorrelation. Even computing the correlations between the congruent foci and bases—a top management focus with normative commitment to top management, or a work group focus with work group identification—an average 57 percent of the variance remains unexplained. In addition, the hierarchical regression analyses discussed below indicate that the foci and bases account for unique variance in dependent variables; such results would not occur if the foci and bases measures were assessing essentially the same constructs.

TABLE 1
Descriptive Statistics

Variables	N	Means	s.d.	α	r[a]
Foci of commitment					
Organization	424	4.32	1.18	.91	.84
Top management	388	2.62	1.48		.69
Supervisor	393	3.89	1.75		.76
Work group	390	4.44	1.57		.68
Bases of commitment					
Organizational internalization	411	2.92	1.22	.94	.80
Organizational identification	412	4.32	1.37	.92	.77
Normative commitment to top					
management	415	3.32	1.30	.95	.78
Supervisor-related internalization	412	4.44	1.51	.93	.77
Supervisor-related identification	412	3.74	1.44	.93	.80
Work-group-related internalization	413	4.51	1.30	.91	.78
Work-group-related identification	413	5.08	1.12	.89	.74
Overall compliance	419	2.97	0.91	.82	.64
Dependent variables					
Intent to quit	424	3.50	1.53	.81	.74
Overall satisfaction	419	4.66	1.02	.92	.81
Intrinsic satisfaction	419	5.08	1.06	.90	.76
Extrinsic satisfaction	419	4.01	1.30	.80	.81
Overall prosocial behavior	428	3.53	0.47	.91	.69
Altruism	426	2.92	0.68	.88	.72
Conscientiousness	427	3.69	0.65	.87	.62
Idleness	426	3.86	0.56	.88	.66

[a] Statistics shown are coefficients of stability across the two administrations.

other than an organization and the bases of commitment add substantially to organizational commitment conventionally conceived, that variable had to be entered into the regression equation before the other foci.

Third, I added commitment to the other foci (top management, supervisor, and work group). There were two reasons for entering the foci of commitment prior to information on the bases. First, an employee must be at least nominally committed to a person or group for it to make sense to speak of motives for that commitment. Second, the evidence to date on the relevance of multiple foci outweighs that for multiple bases (Mathieu & Zajac, 1990) and thus supports the ordering of the analysis on the grounds of research relevance.

Table 3 reports the findings from the regression analysis of the time 2 dependent variables on the four sets of independent variables from time 1, giving the squared multiple correlation (R^2), increment in R^2, and results of the appropriate F-test for each step. As the table indicates, each set of variables accounts for a significant amount of unique variance in the overall satisfaction and intent to quit measures. Further, the demographic variables, commitment to the organization, and commitment to foci other than the

TABLE 2
Correlations[a,b]

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Organization																			
2. Top management	.50																		
3. Supervisor	.46	.49																	
4. Work group	.36	.37	.60																
5. Organizational internalization	.78	.48	.38	.31															
6. Organizational identification	.62	.43	.29	.31	.84														
7. Normative commitment to top management	.64	.65	.39	.28	.72	.65													
8. Supervisor-related internalization	.44	.31	.74	.34	.44	.35	.42												
9. Supervisor-related identification	.46	.38	.70	.39	.51	.49	.52	.84											
10. Work-group-related internalization	.31	.22	.32	.61	.39	.35	.32	.39	.45										
11. Work-group-related identification	.30	.20	.33	.57	.39	.45	.32	.37	.47	.77									
12. Overall compliance	-.16	-.10	-.09	-.14	-.08	-.07	.02	-.09	-.01	-.02	-.11								
13. Intent to quit	-.61	-.34	-.28	-.15	-.44	-.36	-.27	-.26	-.22	-.09	-.13	.21							
14. Overall satisfaction	.53	.37	.43	.31	.44	.33	.42	.49	.42	.27	.29	-.21	-.48						
15. Intrinsic satisfaction	.45	.29	.32	.25	.37	.28	.33	.35	.28	.22	.27	-.20	-.43	.93					
16. Extrinsic satisfaction	.53	.38	.51	.28	.44	.32	.46	.59	.53	.21	.20	-.18	-.46	.86	.62				
17. Overall prosocial behavior	.22	.22	.23	.10	.20	.20	.13	.21	.21	.10	.22	-.18	-.12	.22	.23	.18			
18. Altruism	.18	.23	.26	.27	.16	.15	.12	.19	.20	.18	.24	-.16	-.05	.18	.19	.14	.84		
19. Conscientiousness	.12	.09	.19	.16	.10	.16	.02	.16	.15	.15	.24	-.09	-.07	.13	.15	.07	.76	.57	
20. Idleness	.25	.20	.08	.01	.18	.17	.16	.11	.13	.02	.01	-.11	-.21	.18	.18	.14	.52	.14	.21

[a] Correlations greater than .09 are significant at .05. Data set sizes ranged from 376 to 428.
[b] Correlations between independent and dependent variables are based on commitment variables at time 1 and dependent variables at time 2.

TABLE 3
Results of Hierarchical Regression Analyses

Variables	N	R^2	ΔR^2	F
Overall satisfaction				
Demography	381	.120		5.61***
Organization	381	.362	.243	140.76***
Other foci	360	.413	.050	9.88***
Bases	350	.465	.052	4.01***
Intrinsic satisfaction				
Demography	381	.134		6.61***
Organization	381	.300	.161	84.68***
Other foci	360	.316	.017	2.93*
Bases	350	.351	.035	2.22*
Extrinsic satisfaction				
Demography	381	.047		2.01*
Organization	381	.316	.270	145.69***
Other foci	360	.422	.110	21.06***
Bases	350	.506	.085	7.01***
Overall prosocial behavior				
Demography	390	.088		4.09**
Organization	390	.130	.041	17.98**
Other foci	368	.168	.038	5.42*
Bases	358	.195	.027	1.42
Altruism				
Demography	389	.075		3.41***
Organization	389	.096	.021	8.58**
Other foci	367	.151	.055	7.69***
Bases	357	.175	.024	1.21
Conscientiousness				
Demography	390	.072		3.29***
Organization	390	.082	.010	4.16*
Other foci	368	.120	.038	5.10*
Bases	358	.156	.036	1.78†
Idleness				
Demography	389	.096		4.49***
Organization	389	.149	.053	23.43***
Other foci	367	.175	.025	3.61†
Bases	357	.195	.020	1.05
Intent to quit				
Demography	386	.050		2.07*
Organization	386	.397	.348	216.38***
Other foci	363	.416	.018	3.66*
Bases	353	.461	.045	3.47***

$† p < .10$
$* p < .05$
$** p < .01$
$*** p < .001$

organization result in a significant increment in R^2 in the measures of prosocial organizational behaviors, although the contribution of the foci to explaining variance in idleness is only marginally significant. In contrast, the bases of commitment do not account for significant increments in R^2 in these
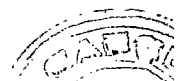
analyses, except for conscientiousness, for which the contribution is marginally significant.[3]

DISCUSSION

The conventional view of work-related commitment is concerned exclusively with organizational commitment and is vague with respect to the role of bases of commitment. As previously noted, researchers have commonly used the OCQ to measure conventionally conceived commitment. By demonstrating that commitment to foci other than an organization, and bases of commitment, account for variance in key dependent variables above and beyond that accounted for by the OCQ, the results of this research support the reconceptualization of employee attachment as a phenomenon with multiple foci and bases.

These results suggest that researchers and practitioners should revise their views and measures of commitment. First, a greater recognition of the importance of multiple foci and bases of commitment is clearly warranted. The implication is that the OCQ should probably be used less frequently than is currently the case. Second, the relevance of particular foci and bases depend upon the criterion of interest. Here, for example, foci and bases of commitment helped to predict satisfaction and intent to quit, but the bases of commitment did not aid in the prediction of prosocial organizational behavior. Future work needs to explore the relevance of multiple foci and bases of commitment with regard to such other criteria as performance. A final suggestion is that future researchers attempt to match the focus of their independent variable with the focus of their dependent variable. For instance, attention to the intended target of prosocial acts would certainly seem relevant in anticipating the focus of commitment relevant to the prediction of such behavior. A researcher interested in, say, altruistic behavior directed toward a work group would be well advised to focus on commitment to the work group rather than on commitment to top management, supervisor, or organization.

Two strengths of this study serve to reinforce these conclusions. First, the psychometric properties of the measures of foci and bases of commitment developed in this study were generally acceptable: alpha coefficients for the multi-item measures were high, test-retest reliabilities for the commitment scales were acceptable, and criterion validities were significant. The only caveat here is that foci other than the organization were measured with single-item scales. Future work needs to create scales more amenable to tests of reliability. Second, the concern for common method variance often raised in self-report investigations such as this one was reduced by using data on commitment variables from one point in time and data on the dependent variables from another.

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[3] I conducted the analyses of overall prosocial organizational behavior, altruism, conscientiousness, and idleness reported in Table 3 again using averaged supervisor and peer ratings of prosocial behaviors and eliminating self-ratings. The results were very similar in terms of tests of significance and the R^2 and increment to R^2 for each dependent variable.

Although the central set of results supported the hypotheses, the amount of unique variance accounted for by commitment to the foci and the bases was small in some cases. For example, in the hierarchical regression equation involving intrinsic satisfaction, commitment to foci other than the organization accounted for only 1.7 percent of the variance uniquely. This finding was statistically significant, but it is reasonable to question the practical ramifications of such a small increment in explained variance. Although this concern should not be ignored, it should be noted that the foci and bases of commitment did account for relatively large proportions of variance in some of the variables; for example, commitment to the various foci accounted for 11 percent of the variance in extrinsic satisfaction, over and above the contribution of the demographic variables and the OCQ items. In addition, it should be remembered that the hierarchical approach taken in this study was a stringent one. To be considered useful, the sets of foci and bases of commitment had to account for unique variance after two previous sets, containing a total of nine variables, had been entered into the equation. In all instances, this procedure reduced the amount of variance available to be explained by the last two sets of variables.

A final issue raised by expanding the study of individual attachment to include the foci and bases of commitment is the creation of commitment profiles. Commitment profiles might be developed by classifying individuals into the cells of a foci-by-bases matrix; for some people, for example, identification with the work group might be central to their attachment to the workplace, and for others, internalization of their supervisor's values might be critical. Empirical validation of such an approach would provide evidence regarding the usefulness of specific foci and bases. Future work should pursue this idea of conceptually and empirically linking the foci and bases constructs.

REFERENCES

Angle, H. L., & Perry, J. L. 1986. Dual commitment and labor-management relationship climates. *Academy of Management Journal,* 29: 31–50.

Ashforth, B. E., & Mael, F. 1989. Social identity theory and the organization. *Academy of Management Review,* 14: 20–39.

Brief, A. P., & Motowidlo, S. J. 1986. Prosocial organizational behaviors. *Academy of Management Review,* 11: 710–725.

Caldwell, D. F., Chatman, J. A., & O'Reilly, C. A. 1990. Building organizational commitment: A multi-firm study. *Journal of Occupational Psychology,* 63: 245–261.

Cammann, C., Fichman, M., Jenkins, D., & Klesh, J. 1979. *The Michigan Organizational Assessment Questionnaire.* Unpublished manuscript, University of Michigan, Ann Arbor.

Clegg, C. W. 1983. Psychology of employee lateness, absence, and turnover: A methodological critique and an empirical study. *Journal of Applied Psychology,* 68: 88–101.

Cook, J. D., Hepworth, S. J., Wall, T. D., & Warr, P. B. 1983. *The experience of work: A compendium and review of 249 measures and their use.* New York: Academic Press.

Cotton, J. L., & Tuttle, J. M. 1986. Employee turnover: A meta-analysis and review with implications for research. *Academy of Management Review,* 11: 55–70.

Dalton, D. R., & Todor, W. D. 1982. Antecedents of grievance filing behavior. *Academy of Management Journal,* 25: 158–169.

Decotiis, T. A., & Summers, T. P. 1987. A path analysis of a model of the antecedents and consequences of organizational commitment. *Human Relations,* 40: 445–470.

Fry, L. W., & Greenfeld, S. 1980. An examination of attitudinal differences between policewomen and policemen. *Journal of Applied Psychology,* 65: 123–126.

Glisson, C., & Durick, M. 1988. Predictors of job satisfaction and organizational commitment in human service organizations. *Administrative Science Quarterly,* 33: 61–81.

Kelman, H. C. 1958. Compliance, identification, and internalization: Three processes of attitude change. *Journal of Conflict Resolution,* 2: 51–60.

Luthans, F., McCaul, H. S., & Dodd, N. G. 1985. Organizational commitment: A comparison of American, Japanese, and Korean employees. *Academy of Management Journal,* 28: 213–219.

Mathieu, J. E., & Zajac, D. M. 1990. A review and meta-analysis of the antecedents, correlates, and consequences of organizational commitment. *Psychological Bulletin,* 103: 171–194.

Morrow, P. C., & McElroy, J. D. 1987. Work commitment and job satisfaction over three career stages. *Journal of Vocational Behavior,* 30: 330–346.

Mowday, R. T., Porter, L. W., & Steers, R. M. 1982. *Employee-organization linkages: The psychology of commitment, absenteeism, and turnover.* New York: Academic Press.

O'Reilly, C. A., III, & Chatman, J. 1986. Organizational commitment and psychological attachment: The effects of compliance, identification, and internalization on prosocial behavior. *Journal of Applied Psychology,* 71: 492–499.

Organ, D. W. 1988. *Organizational citizenship behavior.* Lexington, MA: Lexington Books.

Porter, L., Steers, R., Mowday, R., & Boulian, P. 1974. Organizational commitment, job satisfaction, and turnover among psychiatric technicians. *Journal of Applied Psychology,* 59: 603–609.

Randall, D. M. 1990. The consequences of organizational commitment: Methodological investigation. *Journal of Organizational Behavior,* 11: 361–378.

Reichers, A. E. 1985. A review and reconceptualization of organizational commitment. *Academy of Management Review,* 10: 465–476.

Reichers, A. E. 1986. Conflict and organizational commitments. *Journal of Applied Psychology,* 71: 508–514.

Smith, C. A., Organ, D. W., & Near, J. P. 1983. Organizational citizenship behavior: Its nature and antecedents. *Journal of Applied Psychology,* 68: 653–663.

Vance, R. J., MacCallum, R. C., Coovert, M. D., & Hedge, J. W. 1988. Construct validity of multiple job performance measures using confirmatory factor analysis. *Journal of Applied Psychology,* 73: 74–80.

Weiss, D. J., Dawis, R. V., England, G. W., & Lofquist, L. H. 1967. *Manual for the Minnesota Satisfaction Questionnaire.* Minneapolis: Industrial Relations Center, University of Minnesota.

Williams, L. J., Podsakoff, P. M., & Huber, V. 1986. *Determinants of organizational citizenship behaviors: A structural equation analysis with cross-validation.* Unpublished manuscript, University of Indiana, Bloomington.

Thomas E. Becker earned his Ph.D. degree in industrial-organizational psychology at Ohio State University. He is an assistant professor of management and systems at Washington State University. His current research interests include work-related commitments, the dynamics of performance appraisal, and socially desirable responding within organizations.

STYLE GUIDE FOR AUTHORS

ARTICLES

Submit five copies of the manuscript; be sure that they are good, clear copies and that all pages are included in each copy. The manuscript should by typed on standard size (8½" × 11") paper, *double-spaced throughout* (including footnotes, references, quotations, and appendixes), on only one side of the paper, and with wide margins (one inch or more) at top, bottom, and both sides of each page. Manuscripts prepared on computers should be printed on letter-quality printers or, if other printers are used, in double-strike or enhanced print. Footnotes, references, appendixes, tables, and figures should be on separate sheets of paper and should be arranged at the end of the manuscript in the order listed in this sentence. There is no absolute limit, but the length of articles should not ordinarily exceed 30 manuscript pages, including references, appendixes, tables, and figures.

Title Page and Abstract

The first page of the manuscript should include the title of the article (typed in all capital letters), the authors' names (typed in all capitals), and their affiliations, addresses, and phone numbers (typed with initial caps only). Example:

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MICHAEL A. HITT
College of Business Administration
Texas A&M University
College Station, TX 77843-4221
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No mention of authors' names should be made in the body of the paper, except where appropriate in citations and references.

The second page, numbered page 2, should repeat the title and include an abstract of 75 words or less. The text of the article should begin on page 3. Page numbering should continue through all pages of the manuscript, including those with footnotes, references, appendixes, tables, and figures.

Acknowledgments

An unnumbered footnote can be used to acknowledge financial support and/or assistance of others in preparing the manuscript. In the manuscript, the text for this footnote should appear at the bottom of the same page as the

abstract (page 2). It should be separated from the abstract by a 10-dash line beginning at the left-hand margin.

Footnotes

Other footnotes should be used sparingly. Minimize their use for parenthetical discussion; material that is pertinent can often be integrated into the text. They should *not* be used for citing references (see References below). The text for all footnotes should appear on a separate page or pages at the end of the body of the article.

Headings

Main headings should be used to designate the major sections of the article; three or four main headings should be sufficient for most articles. Initial headings, such as "Introduction," are unnecessary. Main headings should be centered on the page and typed in all capitals. They should *not* be underlined. Example:

<div align="center">

`       METHODS`

</div>

Secondary headings should be typed flush with the left margin and in small letters, with major words beginning with capitals. Secondary headings should *not* be underlined. Example:

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Third-order or *paragraph headings* should begin with a standard paragraph indention and be typed in capital and small letters, with only the initial word capitalized. Paragraph headings should be followed by a period; they should *not* be underlined. Example:

Manager sample. Respondents consisted of a random sample of 300 managers. . . .

The text should follow on the same line.

Tables and Figures

Useful tables and figures do not duplicate the text; they supplement and clarify it. Because tables and figures are considerably more expensive to prepare for publication than text, the degree to which they add to the impact of the manuscript should be considered carefully.

Tables should be typed, double-spaced, on separate pages (one page for each table) from the text. They should be grouped together following the appendixes. If there is no appendix, tables should follow the references. For most papers, the first table should report descriptive statistics, including means, standard deviations, and a complete intercorrelation matrix. Each table should have the word TABLE (typed in all caps) and its number (arabic numerals) centered at the top. The table title should be in capital and small

letters and centered on the page directly under the table number; it should not be underlined. Example:

TABLE 1
Firms in Sample

Tables should be numbered consecutively from the beginning to the end of the article. The position of the table in the manuscript should be indicated in the text as follows:

Insert Table 1 about here

Footnotes to tables are of two types:

(1) General footnotes that explain the table as a whole, the designations of table columns or rows, or an individual item. All of these should be designated by superscript small letters ([a,b,c]), with the footnotes for each separate table beginning with [a].

(2) Footnotes used to indicate the level of significance should follow any other footnotes and be designated by one or more asterisks: * for $p < .05$, ** for $p < .01$, and *** for $p < .001$. Use a dagger symbol (†) for $p < .10$.

If it is necessary to distinguish some numerals in a table from others (for example, to indicate which factor loadings define a factor), boldface type can be used. In the typed manuscript, any numerals that should be set in boldface type should be underlined with a wavy line. This possibility should not be used when other conventions, such as footnotes, are sufficient.

Figures are any illustrations other than tables. Authors should be prepared to supply finished camera-ready artwork for all figures at the time the manuscript is accepted for publication. Unless the authors are highly skilled in graphics, a professional drafting service should be employed to prepare figures.

The spacing and lettering used in figures should allow for subsequent reduction in size by as much as 50 percent so that the figure will fit the size of the *Journal's* page. The original artwork for figures should not be submitted until after the manuscript has been accepted for publication.

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FIGURE 1
Model of Contextual Influences on Performance

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An alphabetically ordered list of references cited in the text should be included at the end of the article. References should begin on a separate page headed REFERENCES. Continue the pagination.

Entries in the list of *references* should be alphabetized by the last name of the author (first author if more than one) or editor, or by the corporate author (U.S. Census Bureau) or periodical name *(Wall Street Journal)* if there is no indication of individual authors or editors. Several references by an identical author (or group of authors) are ordered by year of publication, with the earliest listed first. Multiple references to works by one author or group of authors with the same year of publication should be differentiated with the addition of small letters (a, b, etc.) after the year. Authors' names are repeated for each entry.

Citations to references should be designated throughout the text by enclosing the authors' names and the year of the reference in parentheses. Example:

Several studies (Adams, 1974; Brown & Hales, 1975, 1980; Collins, 1976a,b) support this conclusion.

Note the use of alphabetical order and an ampersand in citations.

Page numbers must be included in a citation to provide the exact source of a direct quotation. Page numbers follow the date of publication given in parentheses and are separated from it by a colon. Example:

Adams has said that writing a book is "a long and arduous task" (1974: 3).

They should also be used when specific arguments or findings of authors are paraphrased or summarized. As indicated in the example, if the name of the author occurs in the body of the sentence, only the year of publication is cited in parentheses. Otherwise, both name and date appear in parentheses, separated by a comma.

If a work has two authors, always cite both names every time the work is cited in the text. If the work has more than two authors, cite all authors the first time the reference occurs; in subsequent citations of the same work, include only the surname of the first author followed by "et al " (not underlined) and the year. Examples:

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(first citation)

... even when random assignment is not possible [Franz et al., 1976: 23).

(subsequent citation)

However, for works with six or more authors, use only the surname of the first author followed by et al. whenever the work is cited.

Book entries in the list of references follow this form: Authors' or Editors' Last Names, Initials. Year. Title of book. (Book titles are underlined and typed in lower case letters except for the first word and the first word after a colon.) City Where Published, State or Country (only if necessary to iden-

tify the city; use U.S. Postal Service abbreviations for state identification): Name of Publisher. Examples:

Boulding, K. E. 1956. The image. Ann Arbor: University of Michigan Press.

Kahn, R. L., & Boulding, E. (Eds.). 1964. Power and conflict in organizations. Glencoe, IL: Free Press.

Katz, D., & Kahn, R. L. 1978. The social psychology of organizations (2nd ed.). New York: John Wiley & Sons.

U.S. Department of Labor Statistics. 1976–1983. Employment and earnings. Washington, DC: U.S. Government Printing Office.

Periodical entries follow this form: Authors' Last Names, Initials. Year. Title of article or paper (in lower case letters except for the first word and the first word after a colon). Name of Periodical, volume number (issue number): page numbers. Examples:

Fry, L. W., & Slocum, J. W., Jr. 1984. Technology, structure, and workgroup effectiveness: A test of a contingency model. Academy of Management Journal, 27: 221–246.

Goggin, W. C. 1974. How the multidimensional structure works at Dow Corning. Harvard Business Review, 55 (1): 54–65.

This issue number should only be included if the periodical's pages are not numbered consecutively throughout the volume, that is, if each issue begins with page 1.

If a periodical article has no author, the name of the periodical should be treated like a corporate author, both in the citation and in the references. For example:

There is fear that Social Security rates may rise (Wall Street Journal, 1984).

Wall Street Journal. 1984. Inflation rate may cause Social Security increase. September 24: 14.

Chapters in books follow this form: Authors' Last Names, Initials. Year. Title of chapter (in lower case except for the first word and first word after a colon). In Editors' Initials and Last Names (Eds.), Title of book: page numbers. City Where Published, State or Country (only if necessary to identify the city): Name of Publisher. Examples:

Berg, N. A. 1973. Corporate role in diversified companies. In B. Taylor & I. MacMillan (Eds.), Business policy: Teaching and research: 298–347. New York: John Wiley & Sons.

Roberts, F. S. 1976. Strategy for the energy crisis: The case of commuter transportation policy. In R. Axelrod (Ed.), Structure of decision: 142–179. Princeton, NJ: Princeton University Press.

Unpublished papers, dissertations, and presented papers should be listed in the references using the following formats:

Duncan, R. G. 1971. Multiple decision making structures in adapting to environmental uncertainty. Working paper no. 54–71, Northwestern University Graduate School of Management, Evanston, IL.

Smith, M. H. 1980. A multidimensional approach to individual differences in empathy. Unpublished doctoral dissertation, University of Texas, Austin.

Wall, J. P. 1983. Work and nonwork correlates of the career plateau. Paper presented at the annual meeting of the Academy of Management, Dallas, TX.

Appendixes

Lengthy but essential methodological details, such as explanations of long lists of measures should be presented in one or more appendixes at the end of the article. This material should be presented in as condensed a form as possible; full sentences are not necessary. No tables should be included in the appendixes. A single appendix should be titled APPENDIX in all caps. If more than one appendix is needed, they should be titled and ordered alphabetically: APPENDIX A, APPENDIX B, etc.

Biographical Sketches

At the time an article is accepted for publication, a brief biographical sketch of 50 words or less should be submitted for each author. It should include where highest degree was earned, present position, affiliation, and current research interests. For example:

Andrea Barber earned her Ph.D. degree at the University of Wisconsin; she is an associate professor of management and Director of the Management Improvement Center at Famous University, Oxbridge, Ohio. Her current research interests include dual-career families and sociotechnical systems in organizations.

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Research notes contain brief descriptions of original research. To be considered for the Research Notes section, manuscripts should not exceed 15 double-spaced typewritten pages in length. Descriptive surveys, replications, methodological demonstrations or analyses, studies that make incremental advances to established areas of inquiry, and commentaries with new empirical content are especially appropriate.

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Authors must avoid terms or usages that are or may be interpreted as denigrating to ethnic or other groups. Authors should be particularly careful in dealing with gender, where long-established customs (e.g., the use of "men and *girls*" in the office or "usually if the employee is given an opportunity, *he* will make the right choice") can imply inferiority where none exists or the acceptance of inequality where none should be tolerated. Using plural pronouns (e.g., changing the "client . . . he" to "clients . . . they" is preferred by Academy publications. If this is not possible, the phrase "he or she" can and should be used.

Use of First Person

Vigorous, direct, clear, and concise communication should be the objective of all articles in Academy journals. Although third-person style traditionally has been used, authors can use the first person and active voice if they do not dominate the communication or sacrifice the objectivity of the research.

1992 Personnel/Human Resources
Scholarly Achievement Award
CALL FOR NOMINATIONS

The Personnel/Human Resources Division of the Academy of Management announces a call for nominations for its annual "Scholarly Achievement Award." The award will be presented to a work published in recognized periodical outlets, such as journals and research annuals, that are generally available to division members. Nominated papers must have a publication date of 1991. Recipients of the award need not belong to the Academy of Management or the Personnel/Human Resources Division.

The Personnel/Human Resource Scholarly Achievement Award is given for the most significant publication on issues important to the Personnel/Human Resource Management field. Publications may be empirically or nonempirically based. Papers nominated for this award will be judged on two criteria: (1) the significance and importance of the problem to P/HR or Industrial Relations, and (2) the extent to which the design, solution, or orientation advances research or theory in the field.

Individuals may nominate one publication for the award. Nominations should be made by a letter to the Chair of the Awards Committee and should include (a) a rationale justifying receipt of the award by the nominee(s), and (b) a full bibliographic citation for the nominated work. Self-nominations will not be accepted.

The award winner will be announced at the August 1992 Academy of Management meeting, during the Personnel/Human Resource Division's business meeting. Award recipients will be presented with a plaque of recognition.

All nominations should be sent to Vida Scarpello, University of Florida, CBA, Department of Management, 219 Business Bldg., Gainesville, FL 32161, (904) 392-0163. **To receive consideration, nominations must be postmarked no later than March 21, 1992.**

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The Organizational Behavior Division of the Academy of Management announces its annual call for nominations for its "Outstanding Publication in Organizational Behavior Award." The award will be presented to the authors of a publication appearing during the 1991 calendar year in a recognized outlet generally available to division members. Recipients of the award need not belong to the Academy of Management.

The "Outstanding Publication in Organizational Behavior Award" is given for the most significant contribution to the advancement of the Organizational Behavior field. Theoretical and empirically-based research publications are eligible.

Each Academy of Management member may nominate one publication for the award, but no member may nominate more than one publication. Nominations should be made in writing and must include (a) a rationale justifying receipt of the award by the nominee(s), and (b) a full bibliographic citation of the nominated work. Self-nominations will not be accepted. **To receive consideration, material must be postmarked no later than March 30, 1992.**

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RESEARCH NOTES

THE SHADOW OF THE FUTURE: EFFECTS OF ANTICIPATED INTERACTION AND FREQUENCY OF CONTACT ON BUYER-SELLER COOPERATION

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This research examined cooperation between 136 industrial buyers and suppliers. We identified four domains of potential cooperation: flexibility, information exchange, shared problem solving, and restraint in the use of power. Using an iterated games framework, we predicted that (1) anticipated open-ended future interaction, or extendedness, and (2) frequency of contact will increase the chances that a pattern of cooperative behavior will occur, but (3) performance ambiguity will decrease such chances. Regression analysis results indicated that extendedness and frequency are associated with joint cooperation. Neither simple structural theories of cooperation nor interactive models stressing commitment would fully predict these results, which support the potential value of interactive perspectives on interorganizational cooperation in particular and on interorganizational relationships in general.

Research on interorganizational relationships has traditionally stressed the importance of fixed organizational traits (Aiken & Hage, 1968; Galaskiewicz, 1985; Pfeffer & Salancik, 1978). Looking at cooperation in particular, researchers have sought to identify fixed antecedents to cooperative relationships. Aiken and Hage (1968) tried to identify internal organizational characteristics that would lead to cooperation. Later theorists have argued that resource dependency and uncertainty will affect both levels and types of collaboration (Pfeffer & Salancik, 1978; Williamson, 1975). At a higher level of analysis, theorists have observed that the political economy may affect the formation of organizational coalitions (Berg & Zald, 1978) and that institutional environments may promote or even require cooperation (Contractor & Lorange, 1988; Hall, Clark, Giordano, Johnson, & Van Roekel, 1977).

Other researchers, however, have called for a more interactive approach to interorganizational relationships (Cook, 1977; Levinthal & Fichman, 1988;

Van de Ven & Walker, 1984; Zeitz, 1980). Such an approach emphasizes that interorganizational cooperation arises in the context of a specific relationship and unfolds through ongoing interaction. Theorists in this tradition have emphasized the development of trust or commitment between participants as precursors to cooperation. In this study, we explored the additional possibility that features of the interaction patterns themselves may affect cooperation. We used an interactive framework to explore interorganizational cooperation in an industrial purchasing setting. We identified four domains of potential cooperation between industrial buyers and suppliers: flexibility, information exchange, shared problem solving, and restraint in the use of power. Drawing on an iterated games framework, we predicted that (1) the degree of open-endedness of a relationship, (2) the frequency of contact as embodied in product deliveries, and (3) performance ambiguity will enhance the chances of cooperation in all four domains.

Our purpose in this inquiry was twofold. First, we wanted to add to the understanding of interorganizational cooperation. Second, we wished to explore further the potential value of interactive models in the systematic study of interorganizational relationships.

THEORY AND HYPOTHESES

Most theorists studying interorganizational cooperation have emphasized the impact of interdependency: parties may cooperate when they depend on each other or share assets (Aiken & Hage, 1968; Pfeffer & Salancik, 1978; Rogers & Whetton, 1982; Williamson, 1985). Interactive theorists, in contrast, have often suggested that cooperation springs from the development of commitment between two "players." Over time, the organizations—or the individuals within them—come to care about their partners and to cooperate out of altruism rather than because of exogenous requirements (Cook, 1977; Deutsch, 1962; Macneil, 1978). Research from this viewpoint has appropriately begun to examine the effects of a relationship's history on levels of cooperation (Levinthal & Fichman, 1988).

This study focused on an additional interactive possibility: anticipated future interaction may affect cooperation. In particular, indeterminate anticipated interaction should promote cooperation. This idea occurs in many literatures but has been developed most precisely in the study of iterated games. The idea is important because it focuses attention on the impersonal characteristics of a relationship and does not assume that commitment is required for cooperation. We first review some basic findings about cooperation in an iterated games framework and summarize relevant research results at several levels of analysis. Then we use this framework to generate three distinct hypotheses about cooperation between two interacting firms.

Anticipated Interaction in a Game Theoretic Context

Social scientists have studied the Prisoner's Dilemma game in a variety of ways for more than 30 years (Rappaport, 1989). In this game, two players

each choose whether to "cooperate" or "defect" in the absence of knowledge of what the other player will do. The incentive structure of the game is set up so that (1) it pays to defect no matter what you think the other player will do, and yet (2) if each player defects, they both end up with less than they would have gotten had they jointly cooperated. The crucial feature is that the players can gain more from joint cooperation than from joint defection, but they would gain even more individually if they could defect while their partner cooperates.

Scholars have for decades considered circumstances that would permit cooperative outcomes in this setting and in related "mixed-motive" game structures (Axelrod, 1984; Kreps, Milgrom, Roberts, & Wilson, 1982; Luce & Raiffa, 1957; Rappaport & Chammah, 1965). Traditional analysis has argued that a purely rational player should defect if there is only one round of play or if there is repeated play but a fixed, known ending point. In a single play of the game, it makes sense to defect because even the payoff for joint defection is higher than that for cooperation when the other person defects, an obvious danger in a single encounter. If there is a fixed end point, each player would anticipate that the other would defect in the final period, and thus defect then. But this reasoning would lead to defection again by both parties in the prior period, and so on, leading to an unraveling of any cooperative pattern.

In contrast, if there is repeated play and an indeterminate ending point, formal mathematical analysis shows that the players may arrive at stable cooperative outcomes through many different mechanisms (Fudenberg & Maskin, 1986; Radner, 1986). Some work has focused on simple reciprocity—a player cooperates whenever the other player cooperated in the prior game and defects in response to defection (Axelrod, 1984; Bendor, 1987; Oskamp, 1971). Interestingly, when preplanned strategies of play were pitted against each other in round-robin computer tournaments, strategies based on reciprocity performed exceedingly well, even against very sophisticated partners (Axelrod, 1984). More recent work has shown that pure reciprocity may need to be tempered with some tolerance of occasional defections when there is uncertainty about what the other player actually did, and a variety of reciprocity strategies may be effective (Bendor, 1987).

The success of reciprocity strategies, however, usually depends on sufficient value being placed on future returns, or on a sufficiently long "shadow of the future" (Axelrod, 1984: 124). Intuitively, the logic is straightforward. Future interactions permit the players to reward and punish each other. If a player cooperated in one round, the other player can reward that move by cooperating in the next round. On the other hand, if the first player defected in one game, the second can retaliate for that defection in the next game by defecting as well. Only if future rewards are important, however, will the threat of future retaliation matter to a player in the present, and thus deter that party from defecting. The length of the interaction should be indeterminate to prevent endgame defections that can lead to the unraveling of cooperation.

This approach, then, does not rest on the assumption that stable organizational traits produce specific levels of cooperation. It does, of course, rely on other assumptions: First, the players decide what to do on a given round of play independently. Second, each player chooses the action believed to produce the highest possible rewards for that party. Altruism may exist, but it is assumed to be already incorporated in the payoff structure. There is no assumption about risk propensity.

Overall, both the analytic study of possible theoretical outcomes of Prisoner's Dilemma and the results of computer tournaments provide a powerful theoretical basis for expecting that anticipated indeterminate future interaction should enhance the chances that the outcomes of repeated play of the game can be cooperative.

Empirical evidence. Empirical research at both the individual and interorganizational levels of analysis provides data relevant to the findings from analytic and tournament studies of iterated games. It has long been shown that context can influence individual's tendencies to cooperate (Lindskold, Getz, & Walters, 1986). Kelley and Thibaut (1978) reviewed experimental studies and concluded that subjects who expected ongoing interaction played more cooperatively than subjects who did not. More recently, Murnighan and Roth (1983) explicitly varied the expected probability of future play and found that expectation of continued play was an important determinant of cooperation.

Although there has been no quantitative research on the effects of anticipated interaction at the interorganizational level of analysis, field observations do provide some evidence. Observers of industrial relations in the United States, for example, have suggested that both firms and unions are much more likely to adopt cooperative strategies when they assume they are likely to interact for an indeterminate future (Bakke, 1946; Kochan, Katz, & McKerszie, 1986; Reder, 1959). Similarly, international scholars have noted that firms that take a long view of a situation are more likely to cooperate with other firms when defection is also a possibility (Buckley & Casson, 1988). Finally, Macneil (1981) argued more generally from the study of contracts that a relationship projected by both parties to last indefinitely will embody a pattern of cooperation.

There is some evidence at two levels of analysis, then, that anticipated future interaction may sustain cooperation. But there have been no systematic studies of this theme or its implications at the interorganizational level of analysis. We used the game-theoretical framework outlined above to develop and discuss three specific hypotheses about how the time horizon and the nature of interaction may affect interorganizational cooperation.

Hypotheses

Extendedness of a relationship. We defined the extendedness of a relationship as the degree to which the parties anticipate that it will continue

into the future with an indeterminate end point. The more strongly a party expects that a relationship will continue in the future and that its end point is indeterminate, the higher is the extendedness of that relationship. A relationship's level of extendedness thus reflects the strength of the expectation that it will continue indeterminately. As described above, the analysis of games implies that although anticipated open-ended interaction does not require cooperation, it does make it possible—even when neither party has altruism or concern about the other party's well-being. The first implication of the iterated games framework then, is that in a Prisoner's Dilemma situation, extendedness in a relationship should increase the probability of a pattern of cooperation.

> *Hypothesis 1: Extendedness in a relationship will have a positive effect on the level of cooperation between two interacting firms in a Prisoner's Dilemma context.*

Frequency of contact. In this framework, the expectation of future interactions gives each party an incentive to cooperate rather than defect in the present. The higher the anticipated number of future interactions, the greater this incentive should be. For a given level of extendedness, however, a higher frequency of contact will lead to greater numbers of expected future interactions. With extendedness controlled, the frequency of interaction should have a positive effect on cooperation (Axelrod, 1984). There are a variety of behavioral mechanisms through which this relationship can unfold. Players may cooperate in the present because they anticipate possible reciprocal future responses. Or they may cooperate in the present because they know that they can retaliate for a defection by defecting later themselves. The greater the number of likely future interactions, the less important is the payoff in a current period relative to the number of potential opportunities for reward or retaliation, and the lower is the relative risk of current cooperation.

In real-world settings, frequency of contact can be increased in a variety of ways, of course. It can be increased through specialization, because when there are few potential relationship partners, one partner is likely to meet a given other partner more often (Axelrod, 1984). Or contact can be deliberately made more frequent by breaking conceptual issues into smaller pieces, a well-known practical tool in conflict resolution processes (Fisher, 1964; Schelling, 1960; Walton & McKersie, 1965). The relevant interactions are those in which concrete opportunities arise for cooperation or for defection. If cooperation arises only from fixed interdependencies or commitment, we would not expect frequency of contact to affect cooperation because it would be irrelevant. To the degree that anticipated interaction is an engine of cooperation, however, frequency of interaction should predict cooperation.

> *Hypothesis 2: Frequency of contact will have a positive effect on the level of cooperation between two organizations interacting in a Prisoner's Dilemma context.*

Performance ambiguity. Performance ambiguity occurs when it is hard for a player to evaluate the outcomes or products received from another party. In a purchasing relationship, for example, it can be hard to assess whether the product delivered is the best it could possibly be, or the result of half-hearted quality efforts. It can be hard to determine whether the other party has faced unpredictable obstacles while trying to deliver on time, or just failed to make a good-faith effort to do so (Buckley & Casson, 1988).

When cooperation is based on observing the other player's actions and responding to them, performance ambiguity can make cooperation more difficult. If a delivery was late, for example, should the recipient interpret that as a defection or assume that the supplier made a cooperative choice that failed because of factors beyond its control? If the first party always gives the second the benefit of the doubt, it sets itself up for exploitation. If the first party treats all poor outcomes as defections, it can create a spiral of joint retaliation. This problem is well known to designers of nuclear test treaties.

This intuition has been confirmed by formal analysis showing that if there is uncertainty about what move the other player made, it is generally more difficult—although not impossible—to sustain cooperative outcomes (Axelrod, 1984; Axelrod & Dion, 1988; Bendor, 1987; Green & Porter, 1984; Molander, 1985). If so, we should find that increased performance ambiguity decreases the chances for cooperation. In contrast, we would not expect performance ambiguity to relate to cooperation arising from structural dependencies or from the development of commitment.

> *Hypothesis 3: Ambiguity in performance evaluation will have a negative effect on the level of cooperation between two organizations interacting in a Prisoner's Dilemma context.*

Control Concepts

Customization of product. In the structural perspective, exchange partners are assumed to be much more likely to cooperate if they are interdependent (Emerson, 1962; Pfeffer & Salancik, 1978; Williamson, 1975). Technological factors are one important potential source of such interdependencies (Barnett & Carroll, 1987). For example, if product customization increases the chances of relationship-specific assets, and asset specificity is linked to increased collaboration (Williamson, 1985), customization should enhance the chances of cooperation. Highly customized products may also simply generate more direct information-sharing needs, which produce cooperative patterns. Customization could also have a negative effect on cooperation, however. In an asymmetrical relationship, the dependency may not be reciprocal, so that one partner has power over the other but not vice versa. In that case, exploitation rather than cooperation might result. Finally, level of customization may also be associated with industry-wide norms regarding cooperation (Zucker, 1987), which should also be controlled for in studying the theoretical variables.

Time to replace trading partner. We define "boundedness" as the degree of difficulty one organization would have in replacing another organization as an exchange partner. One measure of this aspect of interdependency is the amount of time that would be required for a firm to replace a trading partner. If degree of boundedness is asymmetric, the more dependent party may "cooperate" because the other party demands it. Such a pattern of apparent cooperation by the weaker party can be seen as compliance rather than cooperation (Bonoma, 1976). In any event, the time required for each firm to replace its trading partner, representing the boundedness of the firm, needs to be controlled for in predicting cooperation.

Length of prior relationship. Several theories suggest that cooperation should increase with the length of prior relationship. Interaction over time may lead to commitment (Deutsch, 1962) and to relationship-specific assets such as partners' knowledge of each other's procedures and values, which may in turn encourage attachment (Levinthal & Fichman, 1988). It is also possible that firms tend to be either cooperators or defectors, but it takes time for partners to find out which is which. If firms left relationships once they discovered their partners were defectors, we would also see an association between length of prior relationship and cooperation in cross-sectional data. Finally, firms could also learn about each other over time but adopt stable patterns of either cooperation or defection, so that relationship length would have no simple overall main effect on cooperation. Although our concern in this research was with the effects of future interaction, we considered it likely that prior history does affect cooperation and thus included it as our final control variable.

METHODS AND MEASURES

Setting

Purchasing relationships between industrial suppliers and original equipment manufacturers provided the setting for this study. These relationships involve purchases of finished and semifinished components intended for assembly into manufacturers' end products. Traditional buyer-supplier interactions in these industries have been "arm's length" or even adversarial (Dwyer, Schurr, & Oh, 1987). Many buyers purposefully establish relationships with multiple suppliers for each item purchased, with the objective of extracting price concessions (Porter, 1980). In extreme cases, buyers have been found to intentionally design strategies aimed at weakening suppliers, with the ultimate objective of ensuring their own profits (Johnston & Lawrence, 1988). To a large extent, prevailing adversarial attitudes among buyers and suppliers has been a major constraining factor in the implementation of just-in-time inventory systems, which require close coordination between buyer needs and supplier deliveries (Spekman, 1988).

Cooperation thus is not the inevitable outcome of the structure of these relationships. Cooperation has been observed in some relationships, however. Some buyers have allowed suppliers to pass along price increases for

raw materials during periods of inflation, whereas others have consistently
enforced established agreements. Buyers and suppliers have sometimes
worked together to design products and reduce costs and expected to share
the benefits of the interactions bilaterally (Bertrand, 1986; Spekman, 1988).
To apply our hypotheses to this setting, we needed to show that these buyer-
seller interactions embody the structure of the Prisoner's Dilemma game
(Beer, 1986).

   Buyer-seller interaction as Prisoner's Dilemma. First, rational, self-
interested behavior drives many of the actions of the firms involved in these
buyer-seller relationships. Altruism may occur as well (Deutsch, 1962), but
we assumed that it has already been incorporated into the payoff structure
described below. The Prisoner's Dilemma game represents the residual of
interactions not resolved through altruism. Second, the purchasing relation-
ships studied involve two parties interacting in discrete exchanges. In any
given exchange, the potential for cooperation and defection is present for
both parties. The supplier, for example, can defect by delivering late, by
permitting low quality that cannot be readily detected, or by refusing to
adjust to a late change in product or delivery requirements (Johnston &
Lawrence, 1988; Leenders & Blenkhorn, 1988.) The buyer can defect by
making late payments, by unexpectedly changing a design and thereby re-
ducing the value of the supplier's specialized tool investment, or by refusing
to adjust to unexpected problems faced by the supplier (Johnston &
Lawrence, 1988; Klein, Crawford, & Alchian, 1978).

   Third, the ordering of payoffs for cooperation and defection that define
a Prisoner's Dilemma is present in this setting. A firm's immediate payoff is
(1) highest if the firm defects while the other cooperates, (2) next highest
when there is joint cooperation, (3) next highest when there is joint defec-
tion, and (4) lowest if the firm cooperates while the other defects. In addi-
tion, in this industrial setting the payoff to both parties for cooperation is
greater than the payoff for taking turns exploiting each other, again mirroring
the assumptions for a Prisoner's Dilemma. Alternating exploitation would
saddle both parties with additional costs for policing and anticipated en-
forcement and would saddle the buyer with the cost of maintaining safety
inventory.[1] It is important to reaffirm that the benefits of joint cooperation
are not so great that cooperation simply dominates defection for each player
under any circumstances. If it were always beneficial for firms to cooperate
no matter what the other did, we would not have observed the many decades
of stable arms-length industrial relationships in which cooperation has been
uncommon (Johnston & Lawrence, 1988).

   Finally, two apparent deviations from an iterated games framework that
characterize this setting are in fact not deviations. First, in the formal game,
players do not leave the game in response to defection, but organizations can

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[1] A more detailed explication of the payoff structure in the buyer-seller situation is avail-
able from either author.

in principle do so. Field evidence suggests, however, that regardless of this theoretical option, suppliers and buyers do not typically terminate relationships in response to defections of the sort described above. Second, in Prisoner's Dilemma, enforceable contracts do not exist. Although formal contracts do exist in the purchasing context, provisions against many defections (such as late payments or late delivery) are far too costly to enforce formally (Macneil, 1981). Also, many aspects of cooperation—such as flexibility and creative problem solving—simply cannot be specified in contracts.

Sample. Data were collected from both manufacturers and their component suppliers. We questioned both buyers and suppliers in order to achieve parallel tests of our propositions on each side of the buyer-supplier dyad. This data collection strategy allowed us to acknowledge possible differences in viewpoint between exchange partners with respect to the variables of interest, as symbolic interactionist theory would suggest (Marrett, 1971). This strategy also provides a stronger test for the stability of any hypothesized relationships than the more standard approach of sampling from only one group or the other. We drew a random sample of buying firms from a national listing of purchasing agents employed by manufacturing firms having three different two-digit Standard Industrial Classification (SIC) codes. These codes were 35, 36, and 37, representing general machinery, electrical and electronic machinery, and transportation equipment. Preliminary field interviews with agents employed by firms in these categories suggested that these groups were quite homogeneous with regard to purchasing structures, practices, and problems.

Prior to the administration of a mail questionnaire, we contacted each purchasing agent by telephone to ascertain the agent's ability to serve as a key informant, following Campbell's (1955) criteria for informant selection. We sought to exclude suppliers who were simply component distributors as opposed to manufacturers and buyers purchasing only for direct resale because we wanted to study relationships offering the potential of both cooperation and defection. The agent was asked to provide data on the largest firm supplier that met this criterion. Initial field interviews as well as industry evidence showed that relationships involving large quantities were more likely than others to involve mixed motives (Stern & Reve, 1980).

Questionnaires were mailed to 579 purchasing agents. A further step toward minimizing informant bias was inclusion of post hoc self-reports on the informants' knowledge of and involvement in the buyers' relationships with the suppliers. After a second mailing and the elimination of cases in which an informant exhibited insufficient levels of involvement or knowledge or in which data were missing, the final sample from the buyers' side consisted of 155 firms. On a seven-point scale, the mean scores for informant involvement and knowledge were 6.5 (s.d. = 0.85) and 6.5 (s.d. = 0.74), respectively, indicating high degrees of involvement and knowledge concerning the buyer-supplier relationships in question.

Informants from each buying firm were contacted again and asked to identify a person in their supplier's organization who was knowledgeable

about the relationship in question. In total, 96 names were obtained. We contacted those individuals by telephone to establish their ability to serve as key informants prior to mailing out the supplier version of the questionnaire. Informants who were capable of reporting on the relevant aspects of the interfirm relationships returned 60 usable questionnaires. The mean scores on the scales for informant involvement and participation were 6.3 (s.d. = 1.01) and 6.6 (s.d. = 0.67).

One distinct strength of this sample is that it contains responses from both sides of the dyad for a substantial number of cases. It is the only such sample, to our knowledge, in research studying industrial purchasing relationships. It permitted parallel testing of the relationships hypothesized and thus provided a substantive screen against sample-driven results. The response rate for this study was consistent with those in other large-scale surveys of industrial purchasing relationships (Anderson, Chu, & Weitz, 1987; Phillips, 1981), but it was low enough that we consider the research partially exploratory. Comparison of the mean size of all firms in these SIC codes with the mean size of the sample firms suggests that larger firms may be overrepresented in the sample. Caution should thus be used in generalizing our results to smaller firms.

Measures

Measure development. Many of the theoretical constructs in the study were measured using multi-item scales. Following construct domain definitions, we generated items from previous research and modified them to fit the context when necessary. New items were developed through interviews with original equipment manufacturers and suppliers. We personally administered a preliminary draft of the questionnaire to a convenience sample of buyers and suppliers and subsequently refined it. The buyer version of the questionnaire was also subjected to a larger-scale pretest involving 25 randomly selected original equipment manufacturers in the designated SIC codes. We purified the multi-item scales using item-to-total correlations, factor analysis, and Cronbach's alpha values. All the scales exhibit satisfactory evidence of internal consistency in each sample. The alpha levels exceed 0.7, with the exception of three scales which only exceed the 0.6 level. The Appendix gives the texts of all scale items.

Dependent variables. The dependent variable in this study is the level of reciprocal cooperation between two organizations. In the context of the Prisoner's Dilemma framework, an individual cooperative act is a choice to cooperate rather than to defect on a particular exchange. A pattern of reciprocal cooperation, then, is a situation in which the two parties both tend to repeatedly pick the cooperative choice on continuing exchanges.[2]

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[2] This behavioral definition of cooperation extends organization theory tradition, which defines cooperation in terms of voluntary joint activities or programs between a set of parties (Aiken & Hage, 1968; Guetzkow, 1966) but permits variation in the formality or intensity of the

Such a pattern of cooperation can manifest itself (or not manifest itself) in a number of different areas of interaction (Buckley & Casson, 1988). A relationship between two firms may be cooperative in some domains and not in others. For example, cooperation and noncooperation between buyers and suppliers can occur in their actions in the face of unexpected events and in their approaches to the sharing of information, unanticipated problems in the relationship, and the use of power. Cooperation is thus a multidimensional phenomenon that includes the four domains listed below. Specific items in the scales measuring cooperation were substantially based on items developed by Kaufman and Stern (1988).

Flexibility was a four-item scale measuring respondents' assessments of the degree to which they and their partner typically adjust their own behavior to accommodate needs of the other (buyer questionnaire alpha, .88; supplier version alpha, .88). *Information exchange* was a four-item scale measuring respondents' assessments of the degree to which each party discloses information that may facilitate the other party's activities, as opposed to keeping all information proprietary (buyer version alpha, .79; supplier version alpha, .62). *Shared problem solving* was a four-item scale measuring respondents' assessments of the degree to which the parties share the responsibility for maintaining the relationship itself and for problems that arise as time goes on (buyer version alpha, .79; supplier version alpha, .74). *Restraint in the use of power* was a three-item scale measuring respondents' assessments of the degree to which the parties typically refrain from exploiting each other, given the opportunity to do so. We expected cooperation to manifest in a partner's willingness to forgo short-term profits gained at severe cost to the other party (buyer version alpha, .68; supplier version alpha, .63).

Clearly, these are not four different measures of a single construct, level of cooperation between firms, but four different domains in which both cooperation and defection are possible. In principle, a pattern of reciprocal cooperation would be possible in one domain while not occurring in another. Assuming inertia or consistency in organizational behavior, however (Cyert & March, 1963), we expected some positive correlation between the likelihood of cooperative patterns in the four areas.

Independent variables. *Extendedness of the relationship* was a four-item scale measuring respondents' assessments of the open-endedness of future interaction between themselves and their partners, or the degree to which the parties expected the relationship to continue indefinitely (buyer and supplier version alphas, .88). We intentionally avoided using a formalized measure of the anticipated length of a relationship, such as the length

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interaction (Mulford & Rogers, 1982; Schermerhorn, 1975). Our definition differs from the conception of cooperation underlying some work on trust (Deutsch, 1980) as well as Macneil's (1978, 1980) study of relational contracting because it does not assume altruism or any particular cognitive state. Finally, cooperation is contrasted here to defection rather than to competition, whose meaning in this context is ill-defined.

of time stated by a formal contract between the parties. Firms frequently conduct business in the absence of formal contractual provisions (Macaulay, 1963), and even a formal contract may serve more as "a public mark upon an ongoing relation" (Gottfredson & White, 1981: 473) than as a measure of the anticipated continued duration of a relationship.

Not all contacts are comprehended by our theoretical arguments about the effect of frequency of contact on cooperation. The relevant interactions are those exchanges in which two firms can or must cooperate or defect. Foremost of these is the exchange of actual goods, or the delivery of supplies. The variable *frequency of delivery* thus consisted of respondents' estimates of how many times per quarter buyers received deliveries from suppliers. Only the buyer survey requested this information.

Performance ambiguity was a four-item scale measuring respondents' assessments of the level of effort a buyer must put forth to assess the quality of the product produced by a supplier (buyer and supplier version alphas, .66).

Control variables. *Customization of components* measured respondents' assessments of the level of standardization of the components suppliers provided to buyers, with a high value representing complete customization. *Time to replace trading partner* (boundedness) was the reported number of months it would take for a firm to replace its partner. *The logarithm of the length of prior relationship* was the logarithm of the number of months a buyer had been purchasing components from a supplier. We used this measure because we assumed the effect of prior relationship is not linear and that duration has diminishing effects at higher levels.[3]

Construct Validity

Since we argue that the different domains of potential cooperation are theoretically distinct, it was important to test whether our measures were also distinct. To explore this issue, we first estimated a confirmatory factor model using LISREL VI (Jöreskog & Sörbom, 1985) using the buyer sample.[4] Although the chi-square index for the model is significant ($\chi^2_{84} = 144.82$, $p = .00$), suggesting discrepancies between the data and the model, past research has found this index to be an inappropriate measure of model fit

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[3] Correlations between the informant reports for the different independent variables range from .25 to .60, with an average correlation of .39, all significant at the .05 level, which compares quite favorably with those reported in studies of similar populations (Phillips, 1981). However, caution is required in making inferences about the psychometric properties of the measures based solely on these correlations. Measures from different informants may not be "congeneric," or produced by a single underlying trait (Anderson & Gerbing, 1988; Jöreskog, 1971). In addition to random variance, method variance—including variance caused by any systematic differences in the viewpoint of the two informants—is expected to attenuate the raw correlation. The relatively small number of complete dyadic cases studied (*n* = 60) prevented the use of a confirmatory factor model in which we could explicitly model trait, method, and random variance and examine the magnitude of trait correlations (Schmitt & Stults, 1986).

[4] The factor structure is available on request from the authors.

(Fornell & Larcker, 1981). The goodness-of-fit indexes from the LISREL program (goodness-of-fit = .89, root mean square residual = .06) and fit indexes devised by Bentler and Bonett (1980) (Δ = .86, and ρ = .92) both suggested that the model accounts for substantial variance in the data. In addition, the magnitudes of the factor loadings are consistent with our expectations: the loadings ranged from .48 to .93, with 12 of the 15 loadings exceeding .6.

Next, we estimated a series of models in which we constrained the factor correlations to 1 for each pair of variables. We then carried out chi-square difference tests between the original model and each constrained model. The chi-square values for the six pairs of variables ranged from 32.77 to 133.86, all of which were significant below the .001 level. Using each variable separately, then, added significance in each case. Overall, these data suggest the presence of discriminant validity among these measures.

Extendedness and length of prior relationship might be construed as not truly distinct because old relationships may intrinsically imply expectations of future interaction. The zero-order correlation coefficients of the two variables (0.26 and 0.17) are significant at the .05 level, although not high. According to criteria developed by Tesser and Krauss (1976), discriminant validity can be shown if a third variable can be identified that is related significantly to each of two variables, with the relationships in opposite directions. We regressed flexibility on extendedness and on prior length of relationship, using the buyers' sample statistic for the latter because it was the larger. Extendedness had a significant, positive effect (b = 0.55, p = .00), and prior length had a significant, negative effect (b = −0.02, p = .02), indicating the constructs were distinct.

RESULTS

Tables 1 and 2 show the means, standard deviations, and zero-order correlations between all dependent and independent variables for the buyer and supplier samples, respectively. Correlations between the four measures of cooperation are positive, as expected. Individual correlations in the table do not suggest obvious problems of pairwise collinearity that would preclude the use of all independent variables in the model.

Table 3 summarizes the results of ordinary-least-squares regression analyses of the four cooperation variables on the independent variables. Seven out of the eight equations were statistically significant below the .01 level. The adjusted R^2 for the significant equations ranges from 0.182 to 0.344. The moderate, consistent explanatory power of the equations supports the further examination of individual coefficients testing the effects of individual variables.

Extendedness of the relationship has a large and significant positive effect on cooperative behavior in seven of the eight equations. The effects of extendedness appear in both the buyer and supplier samples. To evaluate the consistency of this effect formally, we conducted a series of Chow tests (Chow, 1960; Hanushek & Jackson, 1977) to ascertain the equality of the

TABLE 1
Means, Standard Deviations, and Correlations for Buyers

Variables	Means	s.d.	1	2	3	4	5	6	7	8	9	10
1. Flexibility	5.17	1.24										
2. Information exchange	5.60	1.13	0.443**									
3. Shared problem solving	5.05	1.25	0.412**	0.588**								
4. Restraint in use of power	5.47	1.19	0.258**	0.503**	0.545**							
5. Extendedness of relationship	5.56	1.18	0.472**	0.505**	0.554**	0.423**						
6. Frequency of delivery	13.86	19.13	0.094	0.074	0.127	0.097	−0.016					
7. Performance ambiguity	4.07	1.27	0.063	0.100	0.092	0.126	0.089	0.016				
8. Customization	4.58	2.14	0.144†	0.187*	0.173*	0.051	0.143†	−0.135†	0.313**			
9. Months to replace supplier	5.87	10.56	−0.018	0.107	0.061	−0.060	0.141†	−0.048	−0.006	0.120		
10. Months to replace buyer	4.04	3.98	−0.038	−0.030	0.178*	−0.011	0.151†	0.002	0.245**	0.361**	0.194*	
11. Logarithm of length of prior relationship	1.98	0.95	0.079	0.120	0.081	0.065	0.171*	0.113	−0.403**	−0.155†	0.169*	−0.037

† $p < .10$
* $p < .05$
** $p < .01$

TABLE 2
Means, Standard Deviations, and Correlations for Suppliers

Variables	Means	s.d.	1	2	3	4	5	6	7	8	9
1. Flexibility	5.80	1.04									
2. Information exchange	5.91	0.96	0.499**								
3. Shared problem solving	5.49	1.09	0.385**	0.473**							
4. Restraint in use of power	5.71	1.18	0.383**	0.465**	0.441**						
5. Extendedness of relationship	6.18	0.97	0.394**	0.442**	0.571**	0.386**					
6. Performance ambiguity	3.52	1.30	−0.325*	0.130	−0.099	−0.249†	−0.247†				
7. Customization	4.38	2.22	−0.121	−0.194	−0.185	−0.036	−0.260*	0.134			
8. Months to replace supplier	5.52	4.99	−0.166	−0.272*	−0.235†	−0.062	0.057	0.126	0.240†		
9. Months to replace buyer	4.55	5.55	−0.453**	−0.332**	−0.229†	−0.149	−0.227†	0.079	0.259*	−0.494**	
10. Logarithm of length of prior relationship	1.96	0.91	0.214	0.124	0.278*	0.259*	0.260*	−0.476**	−0.396**	−0.252†	−0.260*

† $p < .10$
* $p < .05$
** $p < .01$

TABLE 3
Results of Regression Analysis of Cooperation Variables on Independent Variables[a]

Variables	Flexibility		Information Exchange		Shared Problem Solving		Restraint in Use of Power	
	Buyers	Suppliers	Buyers	Suppliers	Buyers	Suppliers	Buyers	Suppliers
Extendedness of relationship	.556** (.078)	.249† (.134)	.484** (.075)	.403** (.124)	.583** (.083)	.578** (.116)	.473** (.086)	.490** (.193)
Frequency of delivery	.009† (.005)		.006 (.004)		.009* (.005)		.006 (.005)	
Performance ambiguity	-.076 (.074)	-.206† (.111)	.046 (.071)	-.024 (.104)	.021 (.079)	.098 (.098)	.096 (.081)	-.107 (.162)
Customization	.074† (.043)	.026 (.059)	.082† (.042)	-.011 (.056)	.067 (.046)	.026 (.052)	.007 (.048)	.082 (.087)
Months to replace supplier	-.004 (.008)	.006 (.028)	.004 (.007)	-.043 (.027)	-.004 (.008)	-.051* (.025)	-.011 (.009)	-.012 (.041)
Months to replace buyer	-.038* (.023)	-.070** (.025)	-.030 (.021)	-.019 (.024)	.019 (.024)	.012 (.022)	-.025 (.025)	-.006 (.037)
Length of prior relationship	-.236** (.096)	-.059 (.156)	.063 (.094)	-.122 (.144)	.033 (.102)	.101 (.135)	.039 (.106)	.156 (.224)
Adjusted R^2	.282**	.261**	.274**	.215**	.307**	.344**	.182**	.098
N	137	48	137	49	137	49	136	49

[a] Coefficients are unstandardized. Standard errors are in parentheses.

† $p < .10$
* $p < .05$
** $p < .01$

regression coefficients for the corresponding cooperation models in the two samples. The null hypothesis of no difference between the coefficients in the buyer and supplier samples cannot be rejected at the .05 level for any of the models.

As a further audit on the distinctness of the four measures of cooperation, we conducted a multivariate regression analysis of the four cooperation measures on the independent variables. This analysis indicated that the four dependent variables were indeed related as a group to the independent variables. In the buyers' sample, the multivariate test yielded a Wilks's lambda of .45 with a significance level of less than .01. In addition, however, the univariate test for each dependent variable was significant below the .01 level, indicating that the multivariate significance was not attributable to any one particular variable's relationship to the predictor set of variables. In the supplier sample, Wilks's lambda was .33, significantly below the .01 level. Univariate tests for flexibility, information exchange, and shared problem solving were significantly below the .01 level, and restraint in the use of power was insignificant. Results of seven out of the eight univariate tests were thus significantly below the .01 level.

As one check on potential multicollinearity effects, we omitted extendedness from the model to see if doing so would unmask new effects for control variables. The resulting equations did a much poorer job of predicting cooperation, with only the model for flexibility in the supplier sample and the model for shared problem solving in the buyer sample significant at or below the .05 level. The coefficients for the control variables did not change substantially or become significant owing to reduction in the standard errors, as we might have expected if collinearity masked their effects. The only exception to this result was that the coefficient for prior length of relationship did have a positive effect at the .10 level on information sharing.

A final natural concern is that these results may be the product of common method variance. In the subsample of cases with reports from both buyer and supplier, we regressed the dependent variables from the buyer sample on the independent variables of the supplier sample and vice versa. In six of the eight equations, extendedness remains statistically significant below the .07 level. Extendedness was the only variable that achieved statistical significance in these models.

Frequency of delivery shows a positive effect for all four dimensions of cooperation and is statistically significant at the .05 level for shared problem solving and at the .06 level for flexibility. (The coefficients appear identical in Table 3 because they are rounded to three digits, but the *t*-values are 1.98 for shared problem solving and 1.92 for flexibility.) It was not possible to conduct a Chow test on consistency of effect because frequency of delivery was available only in the buyer sample. When supplier measures of cooperation were regressed on the four buyer measures of the frequency of delivery, no statistically significant effect emerged.

Performance ambiguity is statistically significant in only one of the eight equations. It has a negative effect, as predicted, on flexibility in the supplier

sample. Because there were no consistent effects within samples, we did not examine consistency and methods variance across samples.

Customization has the expected positive effect in two of the eight equations, affecting flexibility and information sharing in the buyer sample. It has no statistically significant effect on the remaining domains of cooperation in either sample. The number of months it will take a buyer to replace a supplier has a negative effect on shared problem solving in the supplier sample. Months to replace the buyer has a negative effect on flexibility in both samples. The logarithm on the length of prior relationship showed no statistically significant effect in seven equations and showed a negative effect in flexibility in the buyer sample. As noted above, prior length of relationship did have a positive effect below the .10 level on information sharing in the buyer sample when extendedness was removed from the equation. Because a curvilinear relationship of cooperation with time might be expected, we also examined the effects of the square of prior length of relationship, with no change in the results.[5]

DISCUSSION AND FURTHER RESEARCH

If cooperation between buyers and sellers can be modeled in an iterated games framework, we should see extendedness, or anticipated open-ended interaction, and frequency of interaction associated with high levels of cooperation. The evidence strongly supported our hypothesis about extendedness and partially supported the hypothesis about frequency. We also predicted that performance ambiguity should reduce cooperation, but we did not find this result. Taken as a whole, then, the results are mixed. We think they are tantalizing, however, and consider below plausible rival interpretations of our data, as well as future research directions.

A statistically significant relationship between extendedness and cooperation emerged in seven of eight equations. This result occurred after we controlled for two variables reflecting interdependence: product customization and time to replace trading partner. This is not a result structural theories of cooperation would predict since they would typically not suggest an independent effect on the time horizons of a relationship itself.

There are, however, theories that would predict a direct association between extendedness and cooperative outcomes. Some firms may develop a commitment to each other that could produce both cooperation and expectations of future interaction. Additionally, firms that report high extend-

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[5] As a further check on the possible impact of competitive context on our results, we constructed a multi-item measure of the respondents' assessments of the diversity of competition in their product markets. We used their reports on (1) whether there were few or many new entries in the market for the end product produced, (2) whether the products in that market were very similar or very different, and (3) whether their competitors' strategies in the end-product market were very similar or very different. When this competitive diversity measure was included in the original models, it was significant in one of the eight equations but did not change the results reported for the theoretical variables of interest.

edness may be early in the product development cycle (W. Barnett, personal communication, 1990). If a supplier is retooling equipment specifically to produce machine parts for a particular buyer, high cooperation may be required as the parties work out product tolerances and technical standards. During this period, both firms might also reasonably report strong expectations of open-ended future interaction. Finally, buyers and suppliers may exist who seek reputations as cooperative firms. If these firms also tend to have open-ended expectations about future interaction of all their trading partners, our results would occur.[6] Our prediction was supported, then, but alternative explanations can be marshaled for the extendedness results.

Frequency of delivery was associated with cooperation in two of four possible equations. Structural theories would predict effects for stable traits that create fixed levels of interdependency rather than for the timing of specific interactions. Turning to commitment theories, we can easily imagine that in personal relationships commitment may lead to increased contact. But we think it is less likely that firms will decide to deliver products more frequently as a result of psychological commitment. Overall, then, we believe the frequency of delivery result, even though less consistent than the extendedness result, is also subject to fewer rival interpretations.

It should be noted that buyer reports of frequency of delivery did not significantly predict supplier measures of cooperation in our check concerning common method variance. However, the relatively exogenous nature of this variable reduces the chances that this result arose from respondents' generalized levels of affect, their wishes to appear consistent, or their efforts to give normatively correct answers.

Performance ambiguity had the predicted negative effect on cooperation in only one domain of cooperation in only one sample. A post hoc explanation rather easily reconciles this finding with our expectations. In measuring performance ambiguity, we asked respondents how much they had to make an effort to assess quality of performance, assuming that if a large effort was required, performance was more ambiguous. We did not ask if the firms actually made the effort, however. If firms who reported that a large effort was required nonetheless did make that effort, they could have assessed whether their partner had defected or cooperated. In that case, we would have predicted no effect for this variable. It is also possible, of course, that the pattern we found was not the product of measurement issues. It may reflect a true situation in which firms end up with both cooperative and noncooperative outcomes under ambiguity, as some would predict (Bendor, 1987).

Among the control variables, customization had weak effects and duration of past relationship no effects on any of the four dimensions of cooperation. Regarding the latter, field observation of this population suggests that relationships can be based on stable histories of suspicion as well as

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[6] We appreciate an anonymous reviewer's emphasis on this point.

cooperation. Firms in an industrial buyer-seller relationship may be able to learn to defect as well as to cooperate. Levinthal and Fichman's study of auditor-client relationships (1988) suggests, however, that this pattern may vary by setting.

In reviewing the total pattern of our results, we noted that although alternative explanations can be found for individual findings, almost no single alternative theory would predict the combination of results obtained. There is one exception. It is possible that in this population, some firms have adopted as a package principles of cooperative interaction, just-in-time inventory procedures, and a tendency to open-ended relationships. Norms favoring this pattern of relationship could diffuse across a population of buyers and suppliers, as neoinstitutional theories predict (Zucker, 1987), producing the results reported here. In all, although there is evidence for our perspective, the pattern of results suggests important questions for further research.

FUTURE RESEARCH

The results of this study and the unresolved issues it raises imply two crucial steps in studying interorganizational cooperation. First and foremost, we see the need for longitudinal studies. Our results are in accordance with the theoretically specified causal sequence outlined in the hypotheses. But cross-sectional data simply do not permit us to rule out some alternative models of, for example, the relationship of extendedness and cooperation. Further research using both archival and self-report data—including measures of anticipated future interaction—could probe the specific sequence of states and actions. Longitudinal studies are important for another reason as well. The concepts we have studied here emphasize conditions that may permit organizations to sustain cooperation. The question of what permits cooperation to develop in the first place is perhaps even more intriguing. Recent theoretical work has begun to provide varied answers to this question (Bartholdi, Butler, & Trick, 1986; Bendor, 1987; Feldman & Thomas, 1987), but empirical evidence on this question is sorely needed.

Second, it may be timely to move from studies that primarily examine individual theories, like this study, to research exploring multiple theories. We think it will be useful to examine both static structural theories and interactive models of cooperation. Specific attention to transaction cost arguments will be important, for example. Our modest results for customization seem consistent with the spirit of Williamson's (1975) prediction that investment in specific assets will lead to shared governance. It is also likely, however, that cooperative relationships promote investment in specific assets, a possibility that calls for investigation. Although we do not think reputational efforts account for the results in this study, they should be included in further study of rational interactive models. Interactive approaches should also try to model the potential role of inertia. Organizations may cooperate with each other out of habit or through imitation of others

(Amburgey & Miner, 1990; Cyert & March, 1963; Zucker, 1987). These processes, of course, would be consistent with the neoinstitutional prediction that routines of cooperation could diffuse across a population of organizations.

Broader studies such as those proposed could also profitably seek larger samples and add further behavioral measures on both sides of the dyad of interest, although the respondents' perceptions would remain the best measures of anticipated future interaction.

IMPLICATIONS

We see two main implications of this exploratory study. First, the results positively, although not conclusively, support the claim that the time framework of a relationship may affect cooperation, as an iterated games perspective would predict. Descriptively, our findings support the insight that expected future interaction in and of itself can influence cooperative acts in the present. They identify a source of cooperation in addition to structural interdependencies and altruism.

Normatively, our findings suggest that interorganizational cooperation might be influenced by adjusting the interaction properties of relationships. Cooperation, of course, may or may not be a valued outcome from society's point of view. It can constitute illegal collusion, like price fixing, in some contexts, but represent desirable collaboration in others—cooperation in pursuit of scientific research or the prevention of war. At present, managers face changing practices in this domain. Joint ventures, close buyer-supplier relationships, and research consortia are increasingly visible, especially in technology-related fields. Interorganizational relationships that contain elements of both competition and collaboration are thus increasingly salient.

Surprisingly, the iterated games framework offers somewhat optimistic predictions if increasing interorganizational cooperation is a goal. If cooperation results only from fixed organizational traits or the development of long-term commitment, then to increase cooperation partners must change fixed traits or invest the time required to develop commitment. In contrast, if cooperation can be increased by increasing the extent of anticipated future interaction or frequency of contact, the chances of cooperation could be sometimes increased more readily. It must be remembered, of course, that these conditions enhance the prospects of cooperation rather than guarantee it. In addition, partners can misrepresent their true intentions concerning future interaction.

Second, this study provides further evidence that interaction frameworks offer an important perspective for examining interorganizational relationships in general. In this study, the iterated games framework generated a set of rather precise testable propositions that, we suggest, traditional explanations of interorganizational cooperation would not predict.

Organization theorists often view game theoretic models with suspicion, regarding their assumptions as both unrealistic and unduly pessimis-

tic. The arguments presented here, however, make no strong assumptions about the calculative ability or foresight of organizations: simple or modified reciprocity could produce our results, for example (Patchen, 1987; Wilson, 1971). In addition, we do not suggest by any means that iterated games always represent an appropriate approach to interactive models. They are but one tool.

Many other modeling approaches can be used. Models may focus on the sequencing of actions (March & Olsen, 1984), rules concerning interpretation of action (Schelling, 1960), ecologies of interaction (Axelrod, 1984; Schelling, 1978), the effects of personal relationships (Granovetter, 1985; Seabright, Levinthal, & Fichman, 1992), and organizations learning from and about each other (Levitt & March, 1988). In all such modeling, however, the focus of attention would be on the characteristics of relationships, rather than on fixed traits of the organizations involved. An organization's fate would depend not only upon its fixed characteristics and commitments, but also upon its actions in response to the actions of others—which can neither be completely anticipated nor reliably controlled.

REFERENCES

Aiken, M., & Hage, J. 1968. Organizational interdependence and intraorganizational structure. *American Sociological Review*, 33: 912–930.

Amburgey, T., & Miner, A. S. 1990. Strategic momentum: The effects of product diversification, decentralization and history on merger activity. *Academy of Management Best Papers Proceedings:* 2–6.

Anderson, E., Chu, W., & Weitz, B. 1987. Industrial purchasing: An empirical exploration of the buyclass framework. *Journal of Marketing*, 51(3): 71–86.

Anderson, J. C., & Gerbing, D. W. 1988. Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, 103: 411–423.

Axelrod, R. 1984. *The evolution of cooperation.* New York: Basic Books.

Axelrod, R., & Dion, D. 1988. The further evolution of cooperation. *Science*, 242: 1385–1390.

Bakke, E. W. 1946. *Mutual survival: The goal of union and management.* New York: Harper & Brothers.

Barnett, W. P., & Carroll, G. R. 1987. Competition and mutualism among early telephone companies. *Administrative Science Quarterly*, 32: 400–421.

Bartholdi, J. J., Butler, C. A., & Trick, M. A. 1986. More on the evolution of cooperation. *Journal of Conflict Resolution*, 30: 129–140.

Beer, F. A. 1986. Games and metaphors. *Journal of Conflict Resolution*, 30: 171–191.

Bendor, J. 1987. In good times and bad: Reciprocity in an uncertain world. *American Journal of Political Science*, 31: 351–358.

Bentler, P. M., & Bonett, D. G. 1980. Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, 88: 583–606.

Berg, I., & Zald, M. 1978. Business and society. In R. H. Turner (Ed.), *Annual review of sociology*, 4: 115–143. Palo Alto, CA: Annual Reviews.

Bertrand, K. 1986. Crafting "win-win situations" in buyer-supplier relationships. *Business Marketing,* 71(6): 42–50.

Bonoma, T. V. 1976. Conflict, cooperation and trust in three power systems. *Behavioral Science,* 21: 499–514.

Buckley, P. J., & Casson, M. 1988. A theory of cooperation in international business. In F. J. Contractor & P. Lorange (Eds.), *Cooperative strategies in international business:* 31–53. Lexington, MA: Lexington Books.

Campbell, D. T. 1955. The informant in quantitative research. *American Journal of Sociology,* 60: 339–342.

Chow, G. C. 1960. Test of equality between subsets of coefficients in two linear regressions. *Econometrica,* 38: 591–605.

Contractor, F. J., & Lorange, P. 1988. Why should firms cooperate? The strategy and economics basis for cooperative ventures. In F. J. Contractor & P. Lorange (Eds.), *Cooperative strategies in international business:* 3–28. Lexington, MA: Lexington Books.

Cook, K. S. 1977. Exchange and power in networks of interorganizational relations. *Sociological Quarterly,* 18(1): 62–82.

Cyert, R. M., & March, J. G. 1963. *A behavioral theory of the firm.* Englewood Cliffs, NJ: Prentice-Hall.

Deutsch, M. 1962. Cooperation and trust: Some theoretical notes. In M. R. Jones (Ed.), *Nebraska symposium on motivation:* 275–320. Lincoln: University of Nebraska Press.

Dwyer, F. R., Shurr, P. H., & Oh, S. 1987. Developing buyer-seller relationships. *Journal of Marketing,* 52: 21–34.

Emerson, R. M. 1962. Power-dependence relations. *American Sociological Review,* 27: 31–41.

Feldman, M. W., & Thomas, E. A. C. 1987. Behavior-dependent context for repeated plays of the Prisoner's Dilemma II: Dynamic aspects of the evolution of cooperation. *Journal of Theoretical Biology,* 128: 297–315.

Fisher, R. (Ed.). 1964. *International conflict and behavioral science: The Craigville Papers.* New York: Basic Books.

Fornell, C., & Larcker, D. F. 1981. Structural equation models with unobservable variables and measurement error: Algebra and statistics. *Journal of Marketing Research,* 18: 382–388.

Fudenberg, D., & Maskin, E. 1986. The folk theorem in repeated games with discounting or with incomplete information. *Econometrica,* 54: 533–554.

Galaskiewicz, J. 1985. Interorganizational relations. In R. H. Turner (Ed.), *Annual review of sociology,* 11: 281–304. Palo Alto, CA: Annual Reviews.

Gottfredson, L. S., & White, P. E. 1981. Interorganizational agreements. In P. C. Nystrom & W. H. Starbuck (Eds.), *Handbook of organizational design:* 471–486. New York: Basic Books.

Granovetter, M. 1985. Economic action and the social structure: The problem of embeddedness. *American Journal of Sociology,* 91: 481–510.

Green, E. J., & Porter, R. H. 1984. Noncooperative collusion under imperfect price information. *Econometrica,* 52: 87–100.

Guetzkow, H. 1966. Relations among organizations. In R. V. Bower (Ed.), *Studies on behavior in organizations:* 13–44. Athens: University of Georgia Press.

Hall, R. H., Clark, J. P., Giordano, P. C., Johnson, P. V., & Van Roekel, M. 1977. Patterns in interorganizational relationships. *Administrative Science Quarterly,* 22: 457–474.

Hanushek, E., & Jackson, J. E. 1977. *Statistical methods for social scientists.* New York: Academic Press.

Johnston, R., & Lawrence, P. R. 1988. Beyond vertical integration: The rise of the value-adding partnership. *Harvard Business Review,* 66(4): 94–101.

Jöreskog, K. 1971. Statistical analysis of sets of congeneric test. *Psychometrika,* 36(2): 109–133.

Jöreskog, K., & Sörbom, D. 1985. *LISREL VI: Analysis of linear structural relationships by maximum likelihood and least squares methods.* Mooresville, IN: Scientific Software Inc.

Kaufman, P., & Stern, L. W. 1988. Relational exchange norms, perceptions of unfairness and retained hostility in commercial litigation. *Journal of Conflict Resolution,* 32: 534–552.

Kelley, H. H., & Thibaut, J. W. 1978. *Interpersonal relations: A theory of interdependence.* New York: Wiley.

Klein, B., Crawford, R. A., & Alchian, A. A. 1978. Vertical integration, appropriable rents, and the competitive controlling process. *Journal of Law and Economics,* 21: 297–326.

Kochan, T. A., Katz, H., & McKersie, R. B. 1986. *The transformation of United States industrial relations.* New York: Basic Books.

Kreps, D., Milgrom, P., Roberts, J., & Wilson, R. 1982. Rational cooperation in the finitely-repeated Prisoner's Dilemma. *Journal of Economic Theory,* 27: 245–252.

Leenders, M. R., & Blenkhorn, D. L. 1988. *Reverse marketing: The new buyer-supplier relationship.* New York: Free Press.

Levinthal, D. A., & Fichman, M. 1988. Dynamics of interorganizational attachments: Auditor-client relationships. *Administrative Science Quarterly,* 33: 345–369.

Levitt, B., & March, J. G. 1988. Organizational learning. In R. Scott & J. Blake (Eds.), *Annual review of sociology,* 14: 319–340. Palo Alto, CA: Annual Reviews.

Lindskold, S., Betz, B., & Walters, P. S. 1986. Transforming competitive or cooperative climates. *Journal of Conflict Resolution,* 30(1): 99–114.

Luce, R. D., & Raiffa, H. 1957. *Games and decisions.* New York: Wiley.

Macaulay, S. 1963. Non-contractual relations in business. *American Sociological Review,* 28: 55–70.

Macneil, I. R. 1978. Contracts: Adjustment of long-term economic relations under classical, neoclassical and relational contract law. *Northwestern University Law Review,* 72: 854–902.

Macneil, I. R. 1980. *The new social contract, an inquiry into modern contractual relations.* New Haven: Yale University Press.

Macneil, I. R. 1981. Economic analysis of contractual relations, its shortfalls and the need for a "rich classificatory apparatus." *Northwestern University Law Review,* 75: 1018–1063.

March, J. G., & Olsen, J. P. 1984. The new institutionalism: Organizational factors in political life. *American Political Science Review,* 78: 734–749.

Marrett, C. B. 1971. On the specification of interorganizational dimensions. *Sociology and Social Research,* 56: 83–99.

Molander, P. 1985. The optimal level of generosity in a selfish, uncertain environment. *Journal of Conflict Resolution,* 29: 611–618.

Mulford, C. L., & Rogers, D. L. 1982. Definitions and models. In D. L. Rogers & D. A. Whetten (Eds.), *Interorganizational coordination:* 9–31. Des Moines: Iowa University Press.

Murnighan, J. K., & Roth, A. 1983. Expecting continued play in Prisoner's Dilemma games. *Journal of Conflict Resolution,* 27: 279–300.

Nunnally, J. C. 1978. *Psychometric theory* (2d ed.). New York: McGraw-Hill.

Oskamp, S. 1971. Effects of programmed strategies on cooperation in the Prisoner's Dilemma and other mixed-motive games. *Journal of Conflict Resolution*, 15: 225–259.

Patchen, M. 1987. Strategies for eliciting cooperation from an adversary. *Journal of Conflict Resolution*, 31: 164–185.

Pfeffer, J., & Salancik, G. 1978. *The external control of organizations.* New York: Harper & Row.

Phillips, L. W. 1981. Assessing measurement error in key informant reports: A methodological note on organizational analysis in marketing. *Journal of Marketing Research*, 18: 395–415.

Porter, M. E. 1980. *Competitive strategy.* New York: Free Press.

Radner, R. 1986. Repeated partnership games with imperfect monitoring and no discounting. *Review of Economic Studies*, L111: 43–57.

Rappaport, A. 1989. Prisoner's Dilemma. In J. Eatwell, M. Milgate, & P. Newman (Eds.), *The new Palgrave game theory:* 199–204. New York: W. W. Norton.

Rappaport, A., & Chammah, A. M. 1965. *Prisoner's Dilemma: A study in conflict and cooperation.* Ann Arbor: University of Michigan Press.

Reder, M. W. 1959. Job scarcity and the nature of union power. *Industrial & Labor Relations Review*, 13: 349–362.

Rogers, D. L., & Whetten, D. A. 1982. *Interorganizational coordination: Theory, research, and implementation.* Des Moines: Iowa University Press.

Schelling, T. C. 1960. *The strategy of conflict.* Cambridge, MA: Harvard University Press.

Schelling, T. C. 1978. *Macromotives and macrobehavior.* Toronto, Canada: W. W. Norton.

Schermerhorn, J. R., Jr. 1975. Determinants of interorganizational cooperation. *Academy of Management Journal*, 18: 846–856.

Schmitt, N., & Stults, D. M. 1986. Methodology review: Analysis of multitrait-multimethod matrices. *Applied Psychological Measurement*, 10(1): 1–22.

Seabright, M. A., Levinthal, D. A., & Fichman, M. 1992. Role of individual attachments in the dissolution of interorganizational relationships. *Academy of Management Journal*, 35: 122–160.

Spekman, R. E. 1988. Strategic supplier selection: Understanding long-term buyer relationships. *Business Horizons*, 31(4): 75–81.

Stern, L. W., & Reve, T. 1980. Distribution channels as political economies: A framework for comparative analysis. *Journal of Marketing*, 44(Summer): 52–64.

Tesser, A., & Krauss, H. 1976. On validating a relationship between constructs. *Educational and Psychological Measurement*, 36: 111–121.

Van de Ven, A. H., & Walker, G. 1984. The dynamics of interorganizational cooperation. *Administrative Science Quarterly*, 29: 598–621.

Walton, R. E., & McKersie, R. B. 1965. *A behavioral theory of labor negotiations.* New York: McGraw-Hill.

Williamson, O. E. 1975. *Markets and hierarchies: Analysis and antitrust implications.* New York: Free Press.

Williamson, O. E. 1985. *The economic institutions of capitalism: Firms, markets, relational contracting.* New York: Free Press.

Wilson, W. 1971. Reciprocation and other techniques for inducing cooperation in the Prisoner's Dilemma game. *Journal of Conflict Resolution*, 15: 196–198.

Zeitz, G. 1980. Interorganizational dialectics. *Administrative Science Quarterly*, 25: 72–88.

Zucker, L. G. 1987. Institutional theories of organization. In R. H. Turner (Ed.), *Annual review of sociology*, 13: 443–464. Palo Alto, CA: Annual Reviews.

APPENDIX

Measures

Dependent Variables

The response scale for the following ranged from 1, "completely inaccurate description," to 7, "completely accurate description."

Flexibility
1. Flexibility in response to requests for changes is a characteristic of this relationship.
2. When some unexpected situation arises, the parties would rather work out a new deal than hold each other to the original terms.
3. It is expected that the parties will be open to modifying their agreements if unexpected events occur.
4. Changes in "fixed" prices are not ruled out by the parties, if it is considered necessary.

Information exchange
1. In this relationship, it is expected that any information that might help the other party will be provided to them.
2. Exchange of information in this relationship takes place frequently and informally and not only according to a prespecified agreement.
3. It is expected that the parties will provide proprietary information if it can help the other party.
4. It is expected that we keep each other informed about events or changes that may affect the other party.

Shared problem solving
1. In most aspects of this relationship the parties are jointly responsible for getting things done.
2. Problems that arise in the course of this relationship are treated by the parties as joint rather than individual responsibilities.
3. The parties in this relationship do not mind owing each other favors.
4. The responsibility for making sure that the relationship works for both us and this supplier is shared jointly.

Restraint in the use of power
1. The parties feel it is important not to use any proprietary information to the other party's disadvantage.
2. A characteristic of this relationship is that neither party is expected to make demands that might be damaging to the other.
3. The parties expect the more powerful party to restrain the use of his power in attempting to get his way.

Independent Variables

Extendedness of relationship (1 = "completely inaccurate description," to 7 = "completely accurate description")
1. The parties expect this relationship to last a lifetime.
2. It is assumed that renewal of agreements in this relationship will generally occur.

3. The parties make plans not only for the terms of individual purchases, but also for the continuance of the relationship.
4. The relationship with this supplier is essentially "evergreen."

Frequency of delivery
On average, how often do you receive deliveries of these components from this supplier (per week, per month, or other)?

Performance ambiguity (1, "strongly disagree," to 7, "strongly agree")
1. It is inadequate to evaluate this supplier based only on component prices.
2. Evaluating the performance of this supplier requires extensive incoming inspection.
3. In order to obtain a satisfactory assessment of this supplier's performance, we need to conduct on-site inspection at the supplier's plant.
4. Conducting performance evaluations of this supplier requires making sure that they follow the approved production and quality control procedures.

Control Variables

Customization of components
Please indicate the degree to which the components that you purchase from this supplier are standardized. (1 = "industry standard components," to 7 = "completely customized components")

Months to replace supplier
Suppose your company were to switch suppliers for these components and start purchasing them from some other source. How much time would the switchover take? (Consider the time required to locate, qualify, train, make the necessary investments, conduct testing, and develop a working relationship.)
_____ months until satisfactory performance could be expected from a new supplier

Months to replace buyer
Suppose that this supplier were to start selling these components to some other buyer. How much time would the switchover take for this supplier? (Consider the time required to redesign the components, modify plant and equipment, train a new buyer, develop new administrative procedures, etc.)
_____ months until a satisfactory relationship could be established with a new buyer

Prior length of relationship
How long has your company been buying these or any other items from this supplier?
_____ months [a]

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[a] We divided answers by 12 to produce years and transformed the results to logarithms for use in the models.

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CONTROL THEORY IN STRATEGIC HUMAN RESOURCE MANAGEMENT: THE MEDIATING EFFECT OF ADMINISTRATIVE INFORMATION

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This study examined the relationship between strategic context, viewed in terms of product-market variation, work flow integration, and firm size, and executive use of human resource management control systems, including input, behavior, and output controls. Data from executives in 102 firms showed the following: a positive relationship between product-market variation and the use of behavior control, mediated by the presence of managers' knowledge of cause-effect relations and the crystallization of standards of desirable performance; a negative relationship between work flow integration and behavior and output control, mediated by crystallization of performance standards; and a positive relationship between firm size and input control that is independent of administrative information. These results are discussed in terms of theory development and future research in strategic human resource management.

The era of strategic human resource management was ushered in nearly a decade ago (e.g., Tichy, Fombrun, & Devanna, 1982), and since that time, a behavioral perspective has emerged as the predominate paradigm for research (e.g., Ferris, Schellenberg, & Zammuto, 1984; Fisher, 1989; Schuler, 1989). Briefly, advocates of the behavioral perspective posit that different strategies require different behaviors and, therefore, different human resource management practices to elicit and reinforce those behaviors. This view of the link between strategy and human resource management is useful for several reasons: it provides a clear explanation for why such management would—and should—be linked to strategy; it posits a testable mediating construct (required behaviors); and it helps researchers tie traditional human resource theories like role behavior to the strategic posture of firms. Not surprisingly, a growing body of empirical evidence supports this perspective (cf. Schuler & Jackson, 1989). Nevertheless, as with any model, certain assumptions and parameters constrain the application of the behavioral perspective. I discuss two of these below by way of developing a complementary model for conducting empirical research on the strategy–human resource management link.

First, although studies have suggested that strategic context influences individual human resource practices such as employee selection (e.g., Gupta & Govindarajan, 1984; Hambrick, 1983), job design (Keefe & Katz, 1990), and appraisal and compensation (e.g., Balkin & Gomez-Mejia, 1990; Gupta, 1987; Kerr, 1985), scholars know very little about how separate human resource management practices combine to produce what Baird and Meshoulam (1987) referred to as "internal fit." Since human resource management has evolved over the years from a disjointed collection of employment practices, it is a field without an integrated conceptual base (Mahoney & Deckop, 1986). Consequently, research has tended to examine one practice at a time. For example, Jackson, Schuler, and Rivero (1989) needed 153 separate equations to test the relationship between strategic context and human resource management. If we are to develop a more parsimonious depiction of the field as a whole, an overarching construct is needed to describe how particular patterns of practice fit together. In the present study, I used the concept of control to integrate human resource management practices and place them in the strategic context of firms.

A second issue related to the behavioral perspective is that it tends to blur the distinction between descriptive and normative theory. More specifically, the behavioral perspective embraces the rational assumption that managers use the practices that are best for their firms. For such to be the case, managers must have a clear knowledge of their organizational contexts, of required behaviors, and of which practices will elicit those behaviors and achieve the firms' strategic goals. Although it may be clear that managers should match preferred human resource management practices to strategy, there is no compelling evidence to suggest that they will, or can, do so. Given the pivotal role of required behaviors in this theory, it is somewhat surprising that no one has undertaken an empirical test for the mediation of a variable measuring such behaviors. Without such a test, the possibility that the strategy—human resource management relationship is due to some other mediator or mediators remains open. In the present study, I viewed administrative information as a construct that intervenes between strategy and human resource management control and tested for its mediation.

It is important to note that the present study does not refute the behavioral perspective. Indeed, a control perspective is consistent with the behavioral perspective in many ways; for instance, control systems mold emergent behavior. By approaching this issue from a slightly different angle than has been previously employed, I hoped to gain a better understanding of how strategy and human resource management are related.

DEVELOPMENT OF A THEORETICAL MODEL

The Concept of Human Resource Management Control

Control can be defined as any process that helps align the actions of individuals with the interests of their employing firm (Tannenbaum, 1968). Typically, firms use a "cybernetic system" (Boulding, 1956) to model the

control process, including (1) superiors' intentions, (2) an influence mechanism, and (3) evaluation and feedback. Some researchers (e.g., Ouchi, 1977) have focused primarily on the evaluation component of control systems; others have presented control in its expanded form, including superiors' intentions and influence as well as evaluation and feedback (Cheng & McKinley, 1983; Hofstede, 1978; Kerr, 1985; Michael, 1973; Reeves & Woodward, 1970; Tannenbaum, 1968; Turcotte, 1974). For the present study, an expanded model of control provided a broad characterization of human resource management.

A variety of typologies have been devised to differentiate control systems (e.g., Ouchi, 1977, 1980; Reeves & Woodward, 1970; Tannenbaum, 1968). The present study focused exclusively on bureaucratic mechanisms (cf. Govindarajan & Fisher, 1990; Jaeger & Baliga, 1985; Ouchi, 1979, 1980). This focus restricted my attention to formal human resource management practices such as staffing, training, performance appraisal, and rewards. Informal modes of personal influence were not considered, precluding examination of small firms, in which control is primarily an informal process. In addition, executives were the sole informants for the study since the human resource management controls used at lower levels of firms tend to vary from those used at higher levels (Schuler & Jackson, 1989).

Since human resource management practices comprise the principal methods used to regulate performance, my proposal is that, as a set, they manifest control. Therefore, rather than examining a myriad of individual practices in isolation, I combined them into three types of control systems: (1) behavior control, (2) output control, and (3) input control. As Figure 1 shows, in the proposed model the nature of administrative information conditions choice between these three types of control (Thompson, 1967).

Behavior control systems. Within a bureaucratic framework, formal behavior control regulates the actions subordinates exhibit on the job. More generally, it structures the transformation process of work (Ouchi, 1977).[1] Based on the assumption of a centralized hierarchy, behavior control is initiated top-down in the form of articulated operating procedures (Cheng & McKinley, 1984; Hitt, Hoskisson, & Ireland, 1990). To ensure that subordinates adhere to procedure, superiors closely monitor and evaluate subordinates' actions over time (Ouchi, 1977; Ouchi & Maguire, 1975; Thompson, 1967). These appraisals tend to be subjective because they are based on the idiosyncrasies of the information that reaches superiors (Turcotte, 1974). In this case, feedback is used principally as a remedial tool to correct deviations as soon as they occur.

The advantage of behavior control is that it is direct. At the extreme, superiors engineer performance protocols that subordinates follow unques-

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[1] Borrowing from Perrow (1967), Thompson (1967), and Ouchi (1977), I define the transformation process as the process by which inputs are converted into outputs. This can also be conceived in terms of a means-ends relationship.

FIGURE 1
Administrative Information and Human Resource Management Control[a]

KNOWLEDGE OF CAUSE/EFFECT RELATIONS
Complete   Incomplete

	Complete	Incomplete
Crystallized	Behavior Control, Output Control, or Both	Output Control • Decentralization • Results criteria • Performance-rewards link
STANDARDS OF DESIRABLE PERFORMANCE		
Ambiguous	Behavior Control • Centralization • Articulated procedures • Close supervision • Behavior appraisal	Input Control • Rigorous staffing • Training-development • Socialization

[a] This figure is adapted from Thompson (1967) and Ouchi (1977, 1978).

tioningly; in effect, control becomes a task design problem. Of course, one disadvantage of behavior control is the substantial cost of personal surveillance (Eisenhardt, 1985), which may, for example, limit span of control. If monitoring costs exceed the marginal gains from control, behavior control may be an inefficient way to regulate performance. In addition, to the extent behavior control standardizes work processes, it reduces the discretion afforded to subordinates and may lead to rigid and cautious behavior (Child, 1973; Hitt et al., 1990; Inkson, Pugh, & Hickson, 1970).

Thompson (1967: 85) argued that behavior control assumes managerial knowledge of "cause/effect relations," or the link between the actions subordinates take and the results they achieve. Eisenhardt (1985) referred to this connection as "task programmability," and Ouchi (1977) called it "knowledge of the transformation process." When cause-effect knowledge is incomplete, and managers do not fully comprehend the transformation process, it is difficult for them to translate their intentions into specific action (Cheng & McKinley, 1983; Ouchi & Maguire, 1975; Turcotte, 1974). Consequently, they cannot standardize actions a priori (Argote, 1982; Brass, 1985; Cheng & McKinley, 1983). Similarly, they have no basis upon which to evaluate the

appropriateness of subordinates' behavior vis-à-vis their intentions (Ouchi, 1977). From this standpoint, Ouchi and Maguire (1975) showed that cause-effect knowledge can be viewed as a prerequisite to the use of behavior control in human resource management.

> *Hypothesis 1: Executives' use of behavior control is pos-*
> *itively related to their knowledge of cause-effect relations.*

Output control systems. As an alternative to using behavior control, managers can control outputs (Ouchi, 1977). Output control differs from behavior control in that superiors do not translate intentions into standard-ized operating procedures but instead set targets, such as financial results, for subordinates to pursue (Hill & Hoskisson, 1987). This form of control provides subordinates discretion in the means they use to achieve desired ends, thus decentralizing control. It does not allow them to choose goals, only the methods used to pursue established targets. Agency theory suggests that in the absence of close supervision, output control might lead to "asym-metric information," or information that is withheld from superiors, result-ing in control loss (Williamson, 1975). In order to avoid this problem and induce performance that fulfills superiors' intentions, elaborate information systems are used that explicitly attach appraisal (Ouchi, 1977) and rewards (Kerr, 1985) to results achieved. A prevalent example of output control is "management by objectives" (Lawler & Rhode, 1976).

One advantage of output control is that it allows for some subordinate discretion yet provides both the incentive and responsibility for results that benefit the employing firm. Subordinates can adapt their behavior to capi-talize on opportunities and avoid threats that arise unexpectedly (Michael, 1973). In addition, in the absence of cause-effect knowledge, an output con-trol like return on investment provides an objective criterion for perfor-mance evaluation (Hoskisson & Hitt, 1988). However, output control is re-active, providing what Flamholtz (1979) referred to as ex post control. There is no mechanism for preventing mistakes until after they occur. In addition, output control can elicit myopic behavior wherein subordinates pursue specified targets to the exclusion of other important, though untargeted, goals. Several authors (e.g., Hill & Hoskisson, 1987; Rappaport, 1978) have argued that overemphasis on short-term financial results may deter execu-tives from making the kind of investments—like R&D investments—needed for long-term firm effectiveness. Since subordinates bear more risk under output control, they are likely to be risk-averse and to pursue relatively safe courses of action.

Viewed with a logic parallel to that involving cause-effect knowledge and behavior control, output control depends on managers having crystal-lized "standards of desirable performance" (Thompson, 1967: 84). Crystal-lized standards require reliable and valid criteria that represent performance benefiting firm. Other authors have called this requirement "outcome ob-servability" (Eisenhardt, 1985) and "availability of output measures" (Ou-

chi, 1977). On the front end of the control cycle, crystallized standards operationally define managerial intentions, and on the back end, they constitute the basis upon which performance is evaluated. When standards shift from crystallized to "ambiguous" (Thompson, 1967), managers cannot establish concrete targets for subordinates to pursue. In view of the work of Ouchi (1977), I would then expect to see less use of appraisal and reward systems based on results. Consequently,

> *Hypothesis 2: Executives' use of output control is positively related to the crystallization of standards of desirable performance.*

Figure 1 shows that when cause-effect knowledge is complete and standards of desirable performance are crystallized, managers can use either form of control (Ouchi, 1977: 98).

Input control systems. The present discussion has so far focused exclusively on performance appraisal and rewards, but two other bureaucratic mechanisms in human resource management play an important role in aligning individuals with the interests of their firms: selection and training. Authors have called the use of selection and training as control mechanisms "input control" (Jaeger & Baliga, 1985), "clan control" (Ouchi, 1979), "skill standardization" (Mintzberg, 1979), "ex ante control" (Flamholtz, 1979), and "socialization control" (Govindarajan & Fisher, 1990). Recently, Govindarajan and Fisher argued that this construct needed greater clarification and operational definition in future research. For this study, I adopted the term "input control" (Jaeger & Baliga, 1985) to distinguish formal bureaucratic human resource management systems such as selection and training from less observable influences that better define clan control or socialization (Ouchi, 1980). In addition, the notion of input provides a symmetrical counterpart to behavior and output control as bureaucratic systems. Input control regulates the antecedent conditions of performance—the knowledge, skills, abilities, values, and motives of employees; behavior control regulates the transformation process; and output control regulates results.

The advantage of input control is that it helps prevent performance problems. Careful staffing and training practices can prevent deficiencies that might be impossible to remedy later. Its disadvantage is that it only manages potential; there is no guarantee that what can be actually will be, and there is virtually no way to identify performance problems post hoc.

When cause-effect knowledge is incomplete and standards of desirable performance are ambiguous, neither behavior control nor output control is likely to be a viable option for managers. Ouchi argued that in such cases executives may resort to the use of input control systems as their final bureaucratic option:

> Organizations in this cell tend to rely heavily on the selection process as their only means of effective control. Thus, the United States foreign service corps . . . cannot measure its outputs and

does not know how to go about transforming manpower into
good foreign relations. It relies heavily upon an extremely diffi-
cult selection procedure which guarantees that its employees
will exceed generally accepted standards of training and ability
(Ouchi, 1977: 98).

Similarly, Mintzberg (1979: 6) placed this issue in the context of colo-
nial empires. Kings, having the capacity to control neither the behaviors nor
the outputs of their colonial governors, placed special emphasis on selection
and training. The use of input controls when superiors have only a general
idea of the qualifications required of subordinates may seem puzzling at
first. In such a case, decisions about the content of selection and training
may be based on apparently arbitrary criteria such as ritual, tradition, con-
vention, and the like (Jaeger & Baliga, 1985; Ouchi, 1977). These ideas lead
to a hypothesis regarding the combined action of cause-effect knowledge and
standards of desirable performance on input control.

> *Hypothesis 3: The interaction of executives' knowledge of
> cause-effect relations and the crystallization of standards
> of desirable performance is negatively related to execu-
> tives' use of input control.*

In summary, the advantages and disadvantages of each type of control
might suggest their combined use in human resource management. Walsh
and Seward (1990) pointed out that control systems should ideally regulate
both motivation and ability. In the present framework, behavior control en-
sures motivation through close supervision, and to a lesser extent, facilitates
the ability of subordinates to perform well by articulating operating proce-
dures. Output control mainly focuses on motivation through the use of in-
centives, providing virtually no direction about how results should be ac-
complished. Finally, input control ensures that employees have the requisite
ability to perform well. In addition, however, Ouchi (1979) pointed out that
selection and training have a socializing influence that aligns the goals of
individuals with those of their firms. Given the overlapping effects of the
three types of control, it is not surprising that firms tend to use elements of
input, behavior, and output control simultaneously (Jaeger & Baliga, 1985;
Ouchi, 1979; Ouchi & Maguire, 1975).

Be that as it may, the basic premise of this study is that the quality of
administrative information available in a firm constrains its primary reliance
on any one type of human resource management control. Administrative
information is assumed to vary across firms. Therefore, to better understand
how control systems vary, researchers need to examine how strategic context
influences cause-effect knowledge and standards of desirable performance. I
examined three aspects of strategic context—product-market variation,
work flow integration, and organizational size—viewing each as a primary
determinant of administrative information and as a secondary determinant
of human resource management control.

Strategy, Administrative Information, and Control

The strategic posture of firms has a direct influence on the administrative information available within them (Chandler, 1962; Rumelt, 1974). In this study, I conceived of strategic posture in terms of product-market variation, or the degree of breadth and change in a firm's products or markets (Hambrick, 1983; Snow & Hrebiniak, 1980). Egelhoff (1982) suggested that increasing product-market variation increases the information-processing demands placed on executives. At low levels of variation, information processing is constrained and internally focused (Thomas & McDaniel, 1990), circumstances allowing executives to monitor activities in operations closely. At the other end of the continuum, a diverse and changing strategic posture tends to demand a broad and externally focused information-processing orientation of executives (Thomas & McDaniel, 1990). Consequently, they are less likely to maintain a detailed working knowledge of operations (Hill & Hoskisson, 1987). Thus,

> *Hypothesis 4: The extent of product-market variation in a firm is negatively related to its executives' knowledge of cause-effect relations.*

Product-market variation is also associated with the pursuit of multiple and at times conflicting goals (March & Simon, 1958; Quinn, 1977). Faced with such conflicts, executives must find some means for reconciling trade-offs between equally desirable outcomes. Executives may experience what Thompson referred to as the "phenomenon of ambivalence" (1967: 85). To deal with complexity, executives might shift from using subtle and erratic, albeit strategic, information to using more generally accessible criteria (O'Reilly, 1982) that synthesize competing demands. In economics, for example, the monetary scale serves as a common denominator that allows comparison across all possible outcomes (Thompson, 1967). In the context of control, readily available standards such as return on equity or on assets may provide reliable (crystallized), objective data with which to judge desirable performance, even though they do not provide rich information. Thus,

> *Hypothesis 5: The extent of product-market variation in a firm is positively related to the crystallization of standards of desirable performance.*

Combining these arguments reveals a path from strategic posture via administrative information to human resource management control. Previous research has suggested that as firms adopt diverse and changing strategic postures, certain aspects of human resource management—most notably, appraisal and reward systems—tend to focus on results (e.g., Kerr, 1985; Lorsch & Allen, 1973; Miles & Snow, 1978, 1984; Murthy & Salter, 1975; Pitts, 1974; Schuler & Jackson, 1989). However, as mentioned at the outset, these studies have implicitly relied on a behavioral perspective to explain the relationship of strategy and human resource management. Control theory

offers a somewhat different view of this link. Specifically, if product-market variation reduces cause-effect knowledge (Hypothesis 4), it follows (Hypothesis 1) that executives would make less use of behavior control as a foundation for human resource management than they would under other conditions.

> Hypothesis 6: The extent of product-market variation in a firm is negatively related to executives' use of behavior control, with their cause-effect knowledge mediating the relationship.

Further, if product-market variation shifts the attention of executives to standardized performance criteria (Hypothesis 5), those individuals would then make much use of output control as a basis for human resource management (Hypothesis 2). Although it is generally consistent with previous research on executives in large diversified firms (e.g., Hill & Hoskisson, 1987; Kerr, 1985; Lorsch & Allen, 1973; Pitts, 1976), the next hypothesis adds to research knowledge by explicitly testing the process of mediation.

> Hypothesis 7: The extent of product-market variation in a firm is positively related to executives' use of output control, with the crystallization of standards of desirable performance mediating the relationship.

If product-market variation is negatively related to cause-effect knowledge and positively related to crystallized standards, no inference can be drawn about input control, which I view as negatively related to the combination of cause-effect knowledge and performance standards. Nevertheless, Mintzberg's argument that, given uncertainty, control will shift from "standardization of work processes and outputs" to "standardization of skills" (1979: 275) is worth noting. The inability to hypothesize a relationship here is a limitation of the present model.

Technology, Administrative Information, and Control

Control theory also suggests other aspects of strategic context that tend to constrain administrative information and, therefore to influence human resource management. Technology in general and work flow integration, the way work flows between units, in particular have a direct impact on the informational demands placed on superiors (e.g., Child, 1973; Perrow, 1967; Reeves & Woodward, 1970; Thompson, 1967). "Pooled" interdependence, for example, requires only that each individual contribute to a general work-in-process inventory (Thompson, 1967). In such a case, cause-effect relationships tend to be straightforward. In contrast, as firms move from pooled to "sequential" and eventually to "reciprocal" interdependence, cause-effect relations become much more complicated and tenuous (Brass, 1985). Given the degree of mutual adjustment that must occur in highly integrated work, it is unlikely that executives will maintain a complete knowledge of work processes. As Reeves and Woodward pointed out, as a conversion process

becomes increasingly complicated, "management can no longer have an intimate knowledge of the various specialized and complex processes that are intrinsic to the task" (1970: 44). Thus,

> *Hypothesis 8: The extent of work flow integration in a firm is negatively related to its executives' knowledge of cause-effect relationships.*

In addition, work flow integration bears on the ability of executives to crystallize performance standards. With the move from pooled and sequential integration to reciprocal integration, work becomes less standardized and predictable (Thompson, 1967). The novelty of work and the number of exceptions that might arise require flexibility in a technical system (Majchrzak, 1988). Such characteristics inhibit the use of the fixed standards that could be effective in a stable work environment. Similarly, in view of the coordination and adjustment among workers integrated work flows require, Jones (1984) argued that it becomes increasingly difficult to ascertain individual contributions to collective performance. The adjustment and interdependence required for work flow integration tends to limit the ability of executives to establish clear-cut performance standards.

> *Hypothesis 9: The extent of work flow integration in a firm is negatively related to the crystallization of performance standards.*

Rackham and Woodward (1970) argued that the purpose of a control system is to cope with the uncertainty arising from technological variation. Extending that notion, I posited that administrative uncertainty, or lack of information, influences human resource management control. More specifically, by combining the arguments above, I hypothesized that as work flow integration increases, cause-effect knowledge diminishes (Hypothesis 8), and the viability of behavior control decreases (Hypothesis 1). If executives cannot prescribe routines for individuals engaged in reciprocally interdependent work relationships, they are unlikely to prefer behavior control as a foundation for human resource management.

> *Hypothesis 10: The extent of work flow integration in a firm is negatively related to executives' use of behavior control, with their cause-effect knowledge mediating the relationship.*

Similarly, to the extent that work flow integration results in ambiguous standards of desirable performance (Hypothesis 9), executives would not prefer output control (Hypothesis 2).

> *Hypothesis 11: The extent of work flow integration in a firm is negatively related to executives' use of output control, with the crystallization of standards of desired performance mediating the relationship.*

Finally, the combined effect of incomplete knowledge of cause-effect relations and ambiguous performance standards is to increase use of input control to regulate performance (Hypothesis 3). This prediction is consistent with recent work by Snell and Dean (1990) and Majchrzak (1988), who found that staffing and training activities are especially vital to firms using integrated manufacturing technology.

> *Hypothesis 12: The extent of work flow integration in a firm is positively related to its executives' use of input control, with their cause-effect knowledge and the crystallization of performance standards mediating the relationship.*

Organization Size, Administrative Information, and Control

Child (1974) argued that firm size limits the capacity of executives to personally monitor the activities of subordinates. Although frequently connected with strategic diversity (Hitt et al., 1990) and technology (Khandwalla, 1974), size can have an independent influence on administrative information. Galbraith (1973) and Khandwalla (1974) argued that executives in large firms face greater demands than those in small firms in terms of the sheer amount of information they must process. As Kimberly pointed out, "As the number of members increases arithmetically, the number of possible communication networks increases exponentially" (1976: 547). Beyond some point, cognitive limitations end an executive's ability to supervise operations personally. In addition, given the structural differentiation associated with largeness (cf. Mahoney, 1979), information tends to become filtered and distorted before it reaches executives. Thus,

> *Hypothesis 13: Organizational size is negatively related to executives' knowledge of cause-effect relations.*

Most previous research on size and control has focused on the transition from personal forms of control to more formal, bureaucratic behavior controls. In general, these studies have suggested that as firm size increases, executives use rules and procedures rather than direct supervision to control behavior (e.g., Child, 1974; Inkson et al., 1970; Samuel & Mannheim, 1970). Bureaucratic controls are used to reduce the frequency of managerial decisions and limit variation in behavior. Since the present model of behavior control makes no distinction between control through direct supervision and control through standardized procedures, replication of previous findings was beyond the scope of this study. However, as Child pointed out, the relationship between size and control is "more complex than previously envisaged" (1973: 1). And although previous studies have implied certain mediating or intervening variables, they have frequently omitted examining their mediation empirically. I viewed behavior control as contingent on the completeness of cause-effect knowledge (Hypothesis 1). Consequently,

> *Hypothesis 14: Organizational largeness is negatively re-*
> *lated to use of behavior control, with cause-effect knowl-*
> *edge mediating the relationship.*

No strong theoretical rationale links largeness to the crystallization of standards of desirable performance. Unlike product-market variation, largeness does not necessarily imply multiple and conflicting goals (Thompson, 1967). Nor does it suggest that activities are unstandardized or interdependent, as does high work flow integration. Consequently, the relationship between size and standards of desirable performance remains indeterminate. By extension, no inferences regarding size and output or input control can be made using the present framework.

METHODS

Firms and Procedures

Selection criteria. I used three criteria to choose firms for inclusion in the study. First, each firm was required to be organized as a single business unit rather than as a multidivisional (M-form) structure. I imposed this criterion to minimize difficulties associated with firms having multiple strategies, technologies, or human resource management control systems in different, possibly autonomous, business units. In addition, since most previous studies of control have focused on large diversified firms (e.g., Hill & Hoskisson, 1987; Hoskisson & Hitt, 1988; Lorsch & Allen, 1973), I undertook to expand the range of empirical findings by observing control in the narrower context of single business units (cf. Govindarajan & Fisher, 1990). Second, I chose only incorporated firms for inclusion, considering them more likely to provide outsiders with company information. Third, since small firms seemed less likely to have formalized human resource management control systems, I chose only firms with assets and revenues over $10 million and at least 250 full-time employees. After eliminating firms listed in Standard & Poor's 1986 *Directory of Corporate Affiliations* that did not satisfy these criteria, I chose 436 firms as suitable for inclusion in the study.

Presidents. Since this research focused on executive use of human resource controls, the initial contact person for each company was its president. I sent each of the 436 presidents a cover letter and a questionnaire measuring strategic context, administrative uncertainty, and human resource management control. After three weeks, a prompting letter and a second questionnaire were mailed to them. In total, 140 of the 436 presidents (32 percent) participated. They represented firms from a wide range of industries (92 different four-digit Standard Industrial Code categories). A heterogenous mix of firms was desirable to maximize variation on the independent variables (Harrigan, 1983) and to ensure that the results could be generalized across industries, providing external validity. The mean asset value of the firms participating was $501 million; their mean annual revenues were $415 million; and their mean number of full time employees was 2,306.

Multiple analysis of variance for revenues, assets, number of employees, industry complexity, munificence, and dynamism[2] showed no significant difference between the participating firms and a random sample of 100 non-participating firms (Wilks's lambda = .99, F = .38, n.s.).

Vice presidents. Each president was also asked to provide the names of three vice presidents in line positions who might participate in the study. By using multiple respondents, I gained independent assessments of strategic context, administrative information, and human resource management control. Of the 140 presidents, 102 (73 percent) provided names of subordinates. I asked each vice president to complete a questionnaire identical to the president's and again mailed a prompting letter and questionnaire after three weeks. Usable data were obtained from 175 of the 306 vice presidents (57 percent). I considered a case valid if at least one vice president from a firm responded; under this criterion, the number of firms included in the study was 102.

Instrumentation

To pilot test the measures, I asked 67 executives in no way affiliated with the participating firms to fill out the survey and to comment on the appropriateness of its wording and length. On the basis of the comments and of a reliability analysis, the questionnaire was modified only slightly for the study. Questionnaire items are described below; the wordings of items originated or adapted for this study appear in the Appendix.

Strategic context. Three measures of strategic context were used. (1) *Product-market variation* was measured with an 11-item Likert scale adapted from Hambrick (1983) and Snow and Hrebiniak (1980). It positions firms along a continuum ranging from 1 to 7 on which low values represent narrow, stable strategic postures and high values represent broad, varied postures. (2) *Work flow integration* was measured with an instrument designed by Van De Ven, Delbecq, and Koenig (1976) to measure Thompson's (1967) three types of work flow integration (independent, sequential, and reciprocal). The three configurations represent increasing levels of technological interdependence. (3) *Firm size* was defined as number of full time employees; Standard & Poor's 1986 *Directory of Corporate Affiliations* provided the data. Following the arguments of Child (1974) and Kimberly (1976) that there is a curvilinear relationship between size and structural complexity, I used a natural logarithmic transformation of the data.

Administrative information. The measures of administrative information were adapted from Ouchi and Maguire (1975), Ouchi (1978), and Thompson (1967). (1) *Knowledge of cause-effect relations* was a 6-item Likert scale measuring the extent to which the relationship between subordinates' actions and outcomes can be predicted and observed. (2) *Crystalli-*

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[2] The section labeled "Instrumentation" discusses the measurements of munificence and dynamism used.

zation of standards of desirable performance was a 5-item scale measuring the extent to which executives have reliable and valid indexes of desirable performance.

Human resource management control systems. The measures of control were based upon research by Kerr (1985), Lorsch and Allen (1974), Michael (1974), Miles and Snow (1978, 1984), Ouchi and Maguire (1975), and Ouchi (1977, 1978). I tried to define and measure control more comprehensively than have previous studies. Most past researchers (e.g., Govindarajan & Fisher, 1990; Ouchi, 1977, 1978) have measured control using only single-item measures whose psychometric properties cannot be determined. The present study's use of multiple items and respondents ensured both internal consistency and interrater reliability. (1) *Behavior control* was a 9-item scale measuring the degree to which standards and procedures are imposed top-down and performance is evaluated via superiors' observation of subordinates' behavior. (2) *Output control* was a 12-item scale measuring the degree to which performance evaluation and rewards are based on the results achieved. (3) *Input control* was a 7-item scale measuring the degree of emphasis placed on rigorous staffing procedures and the opportunity provided for subordinate training and development. To distinguish the construct of input control from clan control and socialization (Ouchi, 1979), I assessed only formal selection and training practices.

Since the scales used to assess human resource management control practices combined measures from a number of different studies, it was necessary to confirm their dimensionality empirically. I conducted a principal components factor analysis with varimax rotation to assess convergence within and divergence between scales. This analysis produced three stable factors representing input, behavior, and output control, each having an eigenvalue above 1.0 and together accounting for 41 percent of variance in the data. Table 1 gives items and factor loadings. In the case of behavior control, three items measuring feedback did not consistently discriminate between the three factors and were dropped from further analysis. The remaining six items were used for behavior control.

Industry environment. Finally, three dimensions of industry environment were measured. Since the strategic contexts of firms tend to vary across industries, I factored these data out of each equation prior to examining the hypothesized relationships (cf. Dess, Ireland, & Hitt, 1990). Data sources were the Department of Commerce's *Census of Manufactures* and Moody's *Industrial Manual*. (1) *Munificence:* Following the procedure suggested by Keats and Hitt (1988), I regressed the natural logarithm of sales against time to determine the average growth in each industry for the years 1982–86, the five years immediately preceding data collection for strategic context and human resource management practices. I then used the antilogarithm of the regression slope as an index of munificence. (2) *Dynamism:* The antilogarithm of the standard error term from each regression equation described above was used to assess the degree of volatility in an industry's sales (Keats & Hitt, 1988). (3) *Complexity:* Following Boyd (1990), I used the MINL for-

TABLE 1
Results of Factor Analysis of Measures of Control[a]

Questionnaire Items	Factor Loadings		
	1	2	3
1. Input control			
Substantial training before responsibility	**.51**	.11	−.14
Establish best staffing procedures possible	**.65**	.11	.06
Involvement in skill development activities	**.65**	−.10	.07
Series of evaluations before hiring	**.41**	.21	−.25
Opportunity to broaden range of talents	**.56**	−.02	.27
Pride in hiring best people possible	**.48**	−.05	.18
Commitment to training and development	**.68**	−.10	.10
2. Behavior control			
Weight in evaluations placed on behavior	.26	.10	**.48**
Accountable for actions, regardless of result	.18	.00	**.31**
Little concern with procedures and methods[b]	.27	.05	**.52**
Consultation in setting standards[b]	.28	.31	**.60**
Performance programs are imposed top-down	.02	−.02	**.61**
Frequent meetings to discuss performance	.55	.21	**.38**[c]
Subordinates responsible for goal-setting[b]	.10	.14	**.41**
Receive frequent performance information	.48	.37	**.24**[c]
Long lag periods required for feedback[b]	.24	.12	**.36**[c]
3. Output control			
Evaluations place weight on results	.08	**.56**	.19
Targets are written in stone[b]	.08	**.51**	−.11
Pay consists of performance-based rewards	.00	**.55**	.35
Pre-established targets for evaluations	.24	**.47**	.02
Numerical records as index of effectiveness	.10	**.63**	−.09
Differences in pay represent performance	−.22	**.36**	−.14
Performance is judged by results	−.26	**.34**	−.29
Rewards are linked to concrete results	.16	**.56**	.31
Infeasible to lock into fixed targets	−.08	**.41**	−.01
Paid on straight salary[b]	−.10	**.45**	.28
Not reaching objectives receive low rating	−.04	**.39**	.25
Appraisal based on reaching goals	−.04	**.55**	−.03
Eigenvalue	4.65	2.81	1.68
Percentage of variance explained	.19	.13	.09

[a] Boldface statistics indicate factor loadings on the proposed constructs.

[b] Item was reverse-coded.

[c] Item was deleted from the final scale.

mula (Schmalensee, 1977) of sales concentration as a surrogate for the Herfindahl-Hirschman index of industry complexity (Herfindahl, 1950; Hirschman, 1945).

RESULTS

Table 2 gives means, standard deviations, coefficient alphas, interrater reliabilities, and intercorrelations for all variables. The alphas indicate internal consistency, and the interrater reliabilities indicate convergence

TABLE 2
Summary Statistics[a]

Variables	Means	s.d.	α	Interrater Reliabilities	1	2	3	4	5	6	7	8	9	10
Environment														
1. Complexity	0.06	0.05												
2. Dynamism	1.04	0.06			-.08									
3. Munificence	1.09	1.14			.03	.28								
Organization														
4. Product-market variation	3.77	0.99	.78	.83	.05	-.08	.10							
5. Work flow integration	2.69	0.45		.86	-.01	-.01	.16	.03						
6. Size	7.10	1.14			.02	.00	.06	.10	.06					
Information														
7. Cause-effect knowledge	3.71	0.86	.65	.87	.02	-.03	.01	.25	.00	-.01				
8. Crystallized performance standards	5.10	1.08	.83	.77	-.17	.01	-.03	.14	-.22	.03	.23			
Human resource management														
9. Behavior control	4.99	0.86	.60	.81	-.15	-.08	-.03	.20	-.13	.07	.28	.45		
10. Output control	4.23	0.72	.71	.88	-.16	-.01	.00	-.10	-.16	.05	.03	.43	.27	
11. Input control	4.81	0.83	.75	.86	-.03	-.04	.05	.15	.11	.17	.16	.21	.38	.03

[a] $N = 102$; correlations with values above .15 are significant at $p < .05$.

within each firm (James, Demaree, & Wolf, 1984). For the measures of cause-effect knowledge and behavior control, the alphas were somewhat lower than the conventional .70 level (Nunnally, 1978). However, the interrater reliabilities for these and the other variables indicate agreement across executives. To reduce threats from common method variance, I used data from the vice presidents for the independent variables and data from the presidents for the dependent variables.

Strategic Context and Administrative Information

To test the notion that administrative information derives from forces in a company's strategic context, I used hierarchical multiple regression analysis. First, the measures of industry environment—complexity, dynamism, and munificence—were entered into the equation as a set. The three measures of strategic context were then entered as a set (product-market variation, work flow integration, and size). These results appear under equations 1–4 of Table 3.

Knowledge of cause-effect relations. With cause-effect knowledge as the dependent variable, strategic context accounted for significant incremental variance ($\Delta R^2 = .09$, F change = 2.86, $p < .05$) after industry was controlled. Product-market variation ($b = .25$, $t = 2.57$, $p < .01$) was positively related to cause-effect knowledge, a finding opposite to the prediction of Hypothesis

TABLE 3
Results of Hierarchical Regression Analysis for
Administrative Information[a]

Variables	Cause-Effect Knowledge				Crystallized Performance Standards			
	Equation 1		Equation 2		Equation 3		Equation 4	
	b	s.e.	*b*	s.e.	*b*	s.e.	*b*	s.e.
Constant	4.95**	1.88	4.14*	2.02	5.50**	2.10	6.32**	2.23
Munificence	−0.10	0.68	−0.21	0.67	−0.07	0.76	0.13	0.74
Dynamism	−1.15	1.64	−0.93	1.60	−0.14	1.83	−0.08	1.77
Complexity	0.85	2.31	0.10	2.29	−1.69	2.58	−2.54	2.53
Size			−0.01	0.09			−0.06	0.10
Product-market variation			0.25**	0.08			0.21*	0.09
Work flow integration			−0.04	0.20			−0.51**	0.22
R^2	.01		.10		.01		.11	
F	.23		1.28		.15		1.55	
df	3,98		6,95		3,98		6,95	
ΔR^2			.09				.10	
F change			2.86*				2.95**	

[a] $N = 102$.
 * $p < .05$
 ** $p < .01$

4. Rather than having less cause-effect knowledge, executives in firms with a broad and dynamic strategic posture appear to have more complete information about the transformation process than executives in firms with a narrow and stable posture. There was no evidence to support predictions that work flow integration (Hypothesis 8) and size (Hypothesis 13) are related to cause-effect knowledge.

Standards of desirable performance. When the dependent variable was standards of desirable performance, two factors in the strategic context were significant ($\Delta R^2 = .10$, F change $= 2.95$, $p < .01$). Product-market variation was positively related ($b = .21$, $t = 1.97$, $p < .05$) and work flow integration was negatively related ($b = -.51$, $t = -2.25$, $p < .01$) to the crystallization of standards of desirable performance. These findings support Hypothesis 5, which predicts that executives in firms taking a broad, dynamic posture tend to use more crystallized measures of performance than do others. In addition, the findings also support Hypothesis 9, predicting that executives in firms with integrated technologies tend to have more ambiguous performance standards.

Administrative Information and Control

The next step in the model was to test the notion that administrative information influences the nature of human resource management control. Again, I used hierarchical multiple regression analysis, entering the measures of industry environment first to control for their extraneous effects and then entering the two measures of administrative information—cause-effect knowledge and standards of desirable performance—as a set. Finally, the cross-product of the two administrative information measures was entered to check for their interaction (Stone & Hollenbeck, 1989).

Behavior control. The results for behavior control are in Table 4. In equation 2, the two types of administrative information yielded a change in R^2 of .32 (F change $= 18.51$, $p < .01$), and both cause-effect knowledge ($b = .39$, $t = 3.95$, $p < .01$) and standards of desirable performance ($b = .33$, $t = 3.68$, $p < .01$) were positive predictors. These findings support Hypothesis 1, which states that executives' use of behavior control increases when they have complete knowledge of cause-effect relations. In addition, the use of behavior control appears to be contingent on executives having crystallized standards of desirable performance, a relationship that was not hypothesized. In equation 3, the interaction term accounted for no incremental variance ($\Delta R^2 = .00$, F change $= .43$, n.s.). Equations 4 and 5 pertain to the direct and mediated effects of strategic context on behavior control and are discussed below.

Output control. The results for output control appear in Table 5. When administrative information was added in the second equation, the value of R^2 increased to .17 (F change $= 8.00$, $p < .01$), and standards of desirable performance ($b = .34$, $t = 3.99$, $p < .01$) was a positive predictor. This finding supports Hypothesis 2, which states that executives' use of output

TABLE 4
Results of Hierarchical Regression Analysis for Behavior Control[a]

Variables	Equation 1		Equation 2		Equation 3		Equation 4		Equation 5	
	b	s.e.	b	s.e.	b	s.e.	b	s.e.	b	s.e.
Constant	6.32**	1.96	2.59**	1.75	1.11	2.85	5.36**	2.09	1.47	2.89
Munificence	-0.12	0.70	0.18	0.59	0.21	0.59	0.16	0.69	0.21	0.60
Dynamism	-1.33	1.70	-0.83	1.43	-0.81	1.44	-1.06	1.66	-0.69	1.43
Complexity	-0.92	2.41	-0.70	2.02	-0.91	2.05	-2.03	2.37	-1.32	2.06
Cause-effect knowledge			0.39**	0.10	0.80	0.63			0.49	0.67
Crystallized performance standards			0.33**	0.09	0.61	0.44			0.39	0.46
Knowledge × standards					-0.08	0.12			-0.02	0.13
Size							0.11	0.09	0.13	0.08
Product-market variation							0.21*	0.09	0.04	0.09
Work flow integration							-0.32*	0.12	-0.14	0.19
R^2	.01		.33		.33		.11		.36	
F	.24		7.61**		6.37**		1.48		4.66**	
df	3,98		5,96		6,95		6,95		9,92	
ΔR^2			.32		.00		.10[b]		.03[c]	
F change			18.51**		.43		2.77[b],*		1.16[c]	

[a] $N = 102$.
[b] Statistics refer to the comparison of equations 4 and 1.
[c] Statistics refer to the comparison of equations 5 and 3.
* $p < .05$
** $p < .01$

TABLE 5
Results of Hierarchical Regression Analysis for Output Control[a]

Variables	Equation 1		Equation 2		Equation 3		Equation 4		Equation 5	
	b	s.e.	b	s.e.	b	s.e.	b	s.e.	b	s.e.
Constant	4.87**	1.71	3.28**	1.69	0.83	2.74	5.91**	1.88	0.59	2.76
Munificence	-0.07	0.62	-0.05	0.57	-0.02	0.57	0.14	0.63	0.16	0.58
Dynamism	-0.48	1.49	-0.50	1.38	-0.45	1.38	-0.60	1.49	-0.57	1.37
Complexity	-1.07	2.10	-0.44	1.94	-0.79	1.99	-1.03	2.12	-0.52	1.98
Cause-effect knowledge			-0.06	0.10	0.62	0.60			0.96	0.64
Crystallized performance standards			0.34**	0.08	0.81*	0.42			1.01**	0.44
Knowledge × standards					-0.13	0.12			-0.19	0.12
Size							-0.02	0.08	-0.02	0.08
Product-market variation							-0.07	0.09	-0.16†	0.09
Work flow integration							-0.28*	0.08	-0.12	0.18
R^2	.01		.17		.19		.05		.23	
F	.11		3.28**		2.95**		.56		2.47**	
df	3,98		5,96		6,95		6,95		9,92	
ΔR^2			.16		.02		.04b		.04c	
F change			8.00**		1.27		1.01b		1.39c	

[a] N = 102.
[b] Statistics refer to the comparison of equations 4 and 1.
[c] Statistics refer to the comparison of equations 5 and 3.
† $p < .10$
* $p < .05$
** $p < .01$

control is dependent on their having crystallized standards of desirable performance. In the third equation, the interaction term had no significant effect (ΔR^2 = .02, F change = 1.27, n.s.). (Results shown in equations 4 and 5 of Table 5 are again discussed subsequently.)

Input control. These results, shown in Table 6, indicate that administrative information accounted for a marginal increment in input control (ΔR^2 = .05, F change = 2.06, p < .10). Specifically, cause-effect knowledge was a positive predictor (b = .18, t = 2.63, p < .05). These findings suggest that executives are more likely to emphasize staffing and training when they have a good understanding of the transformation process, a finding that parallels those for behavior control. In the third equation, the interaction of the two information variables was marginally significant (b = $-.17$, t = -1.58, p < .10). Although the negative direction of the effect is consistent with Hypothesis 3, the form of the relationship is more complicated than was originally hypothesized. Rather than revealing a simple negative interaction effect on input control, these data suggest that standards of desirable performance moderate the positive effect of cause-effect knowledge. In particular, when performance standards are ambiguous, a high level of cause-effect knowledge is associated with a high level of input control. However, if standards are crystallized, use of input control is consistently high, regardless of the level of cause-effect knowledge.

Strategic Context, Administrative Information, and Control

A comparison of two additional hierarchical regression equations was required to test the notion that strategic context influences human resource management control and that administrative information mediates those relationships (Baron & Kenny, 1986; Brass, 1981; Cohen & Cohen, 1983; James & Brett, 1984). In Tables 4–6, the fourth equations show the effects of strategic context on controls with industry environment held constant. A significant incremental effect in these equations would imply that strategic context has a direct effect on control; without a significant effect for strategic context here, there would be no possibility of mediation. In the fifth equation, I again examined strategic context, but this time after controlling for administrative information as well as industry environment. Evidence of mediation would exist when a significant beta in the fourth equation diminishes, perhaps to nonsignificance, in the fifth equation, after administrative information has been factored out (see Schmitt and Klimoski, 1991, for further discussion of this procedure).

Behavior control. In equation 4 of Table 4, strategic context had a significant effect on behavior control with industry environment held constant (ΔR^2 = .10, F change = 2.77, p < .05). More specifically, product-market variation was a positive predictor (b = .21, t = 2.09, p < .05) and work flow integration a negative predictor (b = $-.32$, t = 1.65, p < .05) of behavior control. With the effects of administrative information removed, equation 5 shows that strategic context did not account for a significant increment in

TABLE 6
Results of Hierarchical Regression Analysis for Input Control[a]

Variables	Equation 1		Equation 2		Equation 3		Equation 4		Equation 5	
	b	s.e.	b	s.e.	b	s.e.	b	s.e.	b	s.e.
Constant	5.99**	1.74	4.74**	1.83	1.60	2.96	3.98*	1.87	1.14	2.96
Munificence	0.30	0.62	0.33	0.62	0.36	0.61	0.11	0.62	0.15	0.62
Dynamism	−1.43	1.51	−1.23	1.49	−1.16	1.49	−1.16	1.47	−0.99	1.47
Complexity	0.77	2.13	0.76	2.11	0.32	2.13	0.25	2.11	0.35	2.12
Cause-effect knowledge			0.18*	0.10	1.03†	0.65			0.60	0.68
Crystallized performance standards			0.08	0.09	0.67	0.45			0.42	0.47
Knowledge × standards					−0.17†	0.12			−0.09	0.13
Size							0.18*	0.08	0.17*	0.08
Product-market variation							0.08	0.08	0.01	0.09
Work flow integration							0.16	0.18	0.22	0.19
R^2	.02		.07		.09		.11		.15	
F	.48		1.11		1.24		1.39		1.47	
df	3,98		5,96		6,95		6,95		9,92	
ΔR^2			.05		.02		.09[b]		.06[c]	
F change			2.06†		1.79		2.78[b,]*		1.85[c]	

[a] $N = 102$.
[b] Statistics refer to the comparison of equations 4 and 1.
[c] Statistics refer to the comparison of equations 5 and 3.
† $p < .10$
* $p < .05$
** $p < .01$

behavior control (ΔR^2 = .03, F change = 1.16, n.s.). In fact, the coefficient for product-market variation dropped from .21 ($p < .05$) in equation 4 to .04 (n.s.) in equation 5, a change indicating that cause-effect knowledge and standards of desirable performance mediate the effect of product-market variation on behavior control. Although supporting the overall notion of mediation, these findings are opposite to the predictions of Hypothesis 6. In addition, the original coefficient for work flow integration dropped from −.32 ($p < .05$) in equation 4 to −.14 (n.s.) in equation 5. This change indicates that crystallized performance standards mediate the effect of work flow integration on behavior control. These findings support the control theory that administrative information intervenes in the relationship between strategic context and human resource management but diverge somewhat from the predictions of Hypothesis 10 in that the principal mediating variable was crystallized standards of performance, not cause-effect knowledge. There was no evidence to support or to discredit the prediction of Hypothesis 14 that size is negatively related to behavior control. Perhaps, as Child (1973) noted, the relationship between size and behavior control is more complicated than either this study or previous research has been able to capture.

Output control. Comparing equations 1 and 4 of Table 5 reveals that with industry environment controlled, the effect for strategic context as a whole was not significant (ΔR^2 = .04, F change = 1.01, n.s.). There was no evidence to support Hypothesis 7, stating that product-market variation and output control are positively related. However, work flow integration was a significant predictor ($b = -.28, t = 1.74, p < .05$), indicating that as firms move toward reciprocal work flows, executives make less use of output control as a basis for human resource management. With the effects of administrative information removed, the coefficient of the relationship between work flow integration and output control drops from −.28 ($p < .05$) in equation 4 to −.12 (n.s.) in equation 5. Similar to the findings for behavior control, these findings suggest that crystallized standards of desirable performance mediate the effect of work flow integration on output control: work flow integration is associated with ambiguous standards, and therefore with low use of output control. This finding supports Hypothesis 11 and the overall theory of control in strategic human resource management.

Input control. Equation 4 in Table 6 indicates that strategic context had an effect on input control with industry environment controlled (ΔR^2 = .09, F change = 2.78, $p < .05$). This effect was mainly due to size ($b = .18, t = 2.08, p < .05$) rather than work flow integration, as predicted by Hypothesis 12. With the effects of administrative information removed, equation 5 shows that the effect of size remains relatively unchanged ($b = .17, t = 1.98, p < .05$), suggesting that executives in large firms emphasize staffing and training irrespective of administrative information.

Summary of findings. Of the 14 hypotheses in this study, 7 were supported: Hypotheses 1, 2, 3, 5, 9, 10, and 11; for 2 hypotheses (4 and 6), results were significant in the opposite direction; and 5 were not supported (Hy-

potheses 7, 8, 12, 13, and 14). In addition, three relationships were identified that were not originally hypothesized. Figure 2 summarizes these findings.
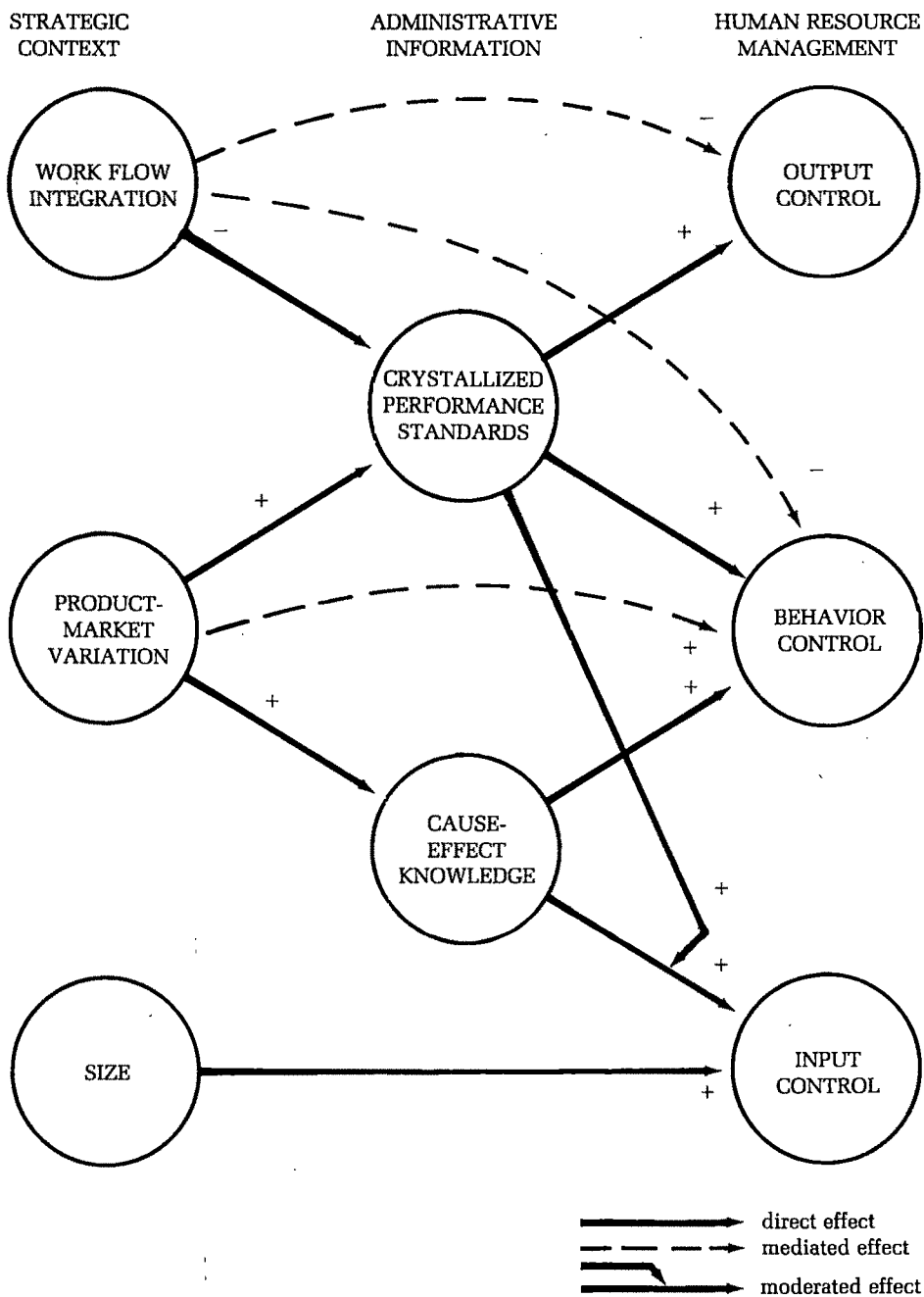
DISCUSSION

Interpretation of Research Findings

In general, this study adds to academic understanding of how human resource management practices hinge on the characteristics of a firm's strategic and administrative contexts. The present results suggest that administrative information mediates the relationships between product-market variation and work flow integration as independent variables and behavior and output control as dependent variables. Several points are notable.

Strategic context and administrative information. Contrary to previous research (e.g., Egelhoff, 1982), the present findings suggest that executives in firms with broad, changing strategic postures have more complete knowledge of cause-effect relations than those in narrow, stable firms. This effect was not overwhelming, but the results do warrant further discussion. One possible explanation may stem from the fact that the firms studied were not as widely diversified as those in previous studies have been (e.g., Kerr, 1985), and all had functional, rather than multidimensional, structures. Perhaps the information-processing demands placed on executives in these firms had not reached the critical threshold that limits their knowledge of operations. If so, it might be that executives operating within a workable range of product-market variation take great care to observe and understand activities in operations. Along these lines, Child (1973) noted that as firms initially increase their level of complexity, executives attempt to retain control through personal attention and centralized decision making. Within limits, these efforts may actually improve understanding of cause-effect relations as product-market variation increases. Clearly, future research is needed to examine this issue in a broader range of strategies and structures. A combination of single- and multiproduct firms would provide a broader range for testing for a curvilinear relationship in which administrative information initially increases but then decreases with increases in product-market variation. In addition, expanding the range of the independent variable (strategic posture) would likely increase the explanation of variance in the dependent variable (Harrigan, 1983).

The results also support the hypothesis that product-market variation leads to the crystallization of standards of desirable performance. It appears that executives take special care to devise precise performance criteria as they lead their firms into dynamic and uncertain competitive environments. Future research is needed to determine whether the use of standardized criteria benefit the firms or merely help executives cope. If standards of desirable performance are artificially crystallized by such means as, for instance, use of short-term financial figures, executives may suffer from criterion deficiency because the summary measures do not capture relevant per-

FIGURE 2
Summary of Findings

STRATEGIC
CONTEXT

ADMINISTRATIVE
INFORMATION

HUMAN RESOURCE
MANAGEMENT

WORK FLOW
INTEGRATION

OUTPUT
CONTROL

−

+

−

CRYSTALLIZED
PERFORMANCE
STANDARDS

PRODUCT-
MARKET
VARIATION

+

+

BEHAVIOR
CONTROL

+

−

+

+

CAUSE-
EFFECT
KNOWLEDGE

+

+

SIZE

INPUT
CONTROL

+

———————▶ direct effect
— — — ▶ mediated effect
———————▶ moderated effect

formance information (Kane & Lawler, 1979). Efforts to increase reliability by imposing concrete standards would not then enhance the validity of assessment.

Findings from this study also support the hypothesis that executives in technically integrated firms have less-crystallized standards by which to judge individual contributions than do those in other firms. This finding is consistent with arguments put forth by Jones (1984) and may pose a practical problem for firms adopting integrated technologies (Dean & Snell, 1991). As group-oriented output becomes the norm and patterns of interaction fluctuate, managers may have to resort to more socially based information sources to assess performance, such as peer assessments. What is interesting about this finding is that there was no support for the hypothesis that work flow integration adversely affects cause-effect knowledge. Although there are certainly a host of reasons for nonsignificant findings, such as measurement or sampling error, one possible explanation here is that as work flows become increasingly complicated executives invest in vertical information systems to increase their information-processing capacity (Galbraith, 1973).

In addition, I observed no relationship between size and cause-effect knowledge. Size has long been a difficult variable to study since its effects are frequently confounded with structural complexity, differentiation, and integration (cf. Child, 1974; Kimberly, 1976). Mintzberg (1979) argued that "the larger the organization, the more that behaviors repeat themselves; as a result, the more predictable they become" (1979: 233). In contrast, Litterer (1965) and Hrebiniak (1978) argued that organizational largeness makes behavior less predictable because the distance between superiors and subordinates is great. Clearly, each of these arguments is based on assumptions about structure. In one sense, size may limit the flow of administrative information, whereas structure could facilitate it (Galbraith, 1973). Since the present study attempted to hold structure constant, it was not possible to observe how these two variables interrelated. Future research should examine how size and various aspects of structure like centralization and formalization interact with the flow of administrative information.

Administrative information and control. The findings suggest that the use of each type of human resource management control system directly depends on the amount and type of administrative information available to executives. In particular, the use of behavior control is dependent on executives having complete cause-effect knowledge as well as crystallized standards of desirable performance. These conditions parallel those Thompson (1967) described as necessary for an "efficiency test" to control performance. As firms move away from the administrative conditions that characterize the certainty of a closed system (Hofstede, 1978), behavior control appears to be used less as a foundation for human resource management. In contrast, executives' use of output control seems to be constrained by their having a clear set of standards by which to judge subordinates' contributions. This pattern suggests that goals and incentives can be used in human resource

management to control performance when cause-effect relations are not completely known. Finally, the use of input control depends on complete cause-effect knowledge and, to a lesser extent, its interaction with performance standards. The negative interaction in this case indicates that when performance standards are crystallized, input control tends to be consistently high across levels of cause-effect knowledge. Thus, input control in human resource management may act in conjunction with behavior control. On the surface, it seems rational to presume that selection and training require an understanding of the behaviors needed on a job.

Overall, these findings imply three things: First, the constructs of input, behavior, and output control provide a viable framework for integrating human resource management practices. As stated at the outset, this framework depicts those practices more parsimoniously than have others, and it helps tie human resource management as a whole to theories of organization. It is important to note, however, that this framework only begins to untangle the possible patterns of human resource management practices. I made no distinction, for example, between types of selection and training systems, only noting whether or not they were emphasized. Future research might investigate the more fine-grained aspects of input, behavior, and output control as they are translated into particular human resource practices. Second, although input, behavior, and output controls constitute distinct patterns of practice, they do not appear to be mutually exclusive. Instead, the three types may serve different purposes and could be implemented together (Ouchi & Maguire, 1975). In view of their relative strengths and weaknesses, it may be that a combination of the three can resolve what Khandwalla (1973) called the "antagonistic requirements" of efficiency and creativity. Finally, it is clear from these findings that no matter which human resource management control practice is examined, incomplete administrative information is associated with low reliance on practices to control performance. This finding is consistent with Mahoney and Deckop's (1986) view that human resource management emerged under the assumptions of a bureaucracy and that as those assumptions change, scholars' and practitioners' view of the area must also change.

Control and strategic context. The results show that firms with different strategic postures tend to use different human resource management practices for control. Although this general notion is consistent with previous work on strategic human resource management and control, some of my findings differ from those of other studies. For example, I found product-market variation to be associated with extensive use of behavior control among executives; other researchers (e.g., Hoskisson & Hitt, 1988; Kerr, 1985; Lorsch & Allen, 1973) have argued just the opposite. Characteristics of the firms studied here, such as their unitary product lines, or my conception of strategy (in terms of product-market variation) might account for that discrepancy. However, the present results are directly attributable to the nature of administrative information. If executives do not have complete

cause-effect knowledge or crystallized standards of desirable performance, behavior control is not likely to be a viable basis for human resource management.

The current study tested a model wherein strategy influences administrative information and then influences control. This argument can be extended to develop a longitudinal perspective that explains the current findings. For example, it may be that strategic context *initially* creates informational problems that predispose executives to certain human resource management practices. However, by using these controls they may actually lessen initial problems of information; for instance, use of behavior control may accentuate cause-effect relations, and use of output control may crystallize standards. Over time, the use of certain human resource controls may increase the type of administrative information that was initially lacking. Chandler (1963), Egelhoff (1983), and Rumelt (1974) suggested a similar pattern in the relationship between strategy and structure. Structure—or, in this study, human resource management control—eliminates the uncertainty arising from strategic context. Such a longitudinal perspective might explain the current findings, but it would be unwise to draw conclusions from the current data. Future research could test this theory by examining strategic context, control, and administrative uncertainty over time.

Since product-market variation had no noticeable effect on output control, it is impossible to draw any conclusions about how results appraisals and performance-contingent rewards relate to the strategic posture of firms. Perhaps this lack of findings results from the study's limitation to single-product firms. Previous research (Kerr, 1985; Lorsch & Allen, 1973) has tended to examine corporate diversification and control, so the range of the strategy variable was potentially greater. Inadvertent range restriction could have attenuated the observed correlations.

The results of the present study show that work flow integration is associated with low use of both behavior and output control and that those relationships are due to the fact that performance standards tend to be ambiguous when work flow integration is high. Since both types of control were adversely affected, it appears that bureaucratic controls in general are used less as a basis for human resource management when firms adopt integrated technologies. Input control would be an exception here. Future research is needed to examine the possibility that integrated technologies have a reversing effect on bureaucracy (Dean & Snell, 1991). Such occurrences might substantially affect human resource management.

Work flow integration had no effect on input control. In view of the moderately high mean response for this variable, it may be that selection and training are fairly constant aspects of human resource management control, regardless of a firm's technological configuration, and that they merely appear to grow in importance when other types of control are used less. Future research might examine the comparative use of input, behavior, and output control rather than simply their absolute levels of use.

The results show that as firm size increases, executives make greater use of input controls. Interestingly, this finding is completely independent of the nature of administrative information. One explanation might be that large firms tend to have more money to spend on human resource management practices. At a minimum, economies of scale decrease costs per employee.

Size had no effect on the use of behavior control here. This finding at first appears to be inconsistent with the findings of a long stream of research (e.g., Child, 1974; Inkson et al., 1970). As noted earlier, I combined direct supervision (informal control) and rules and procedures (formal control) into one measure, perhaps making the measure insensitive to subtle differences across firms. Future research should make a better distinction between formal and informal behavior controls (cf. Hitt et al., 1990) as they relate to human resource management.

Limitations of the Study

Apart from the limitations noted above, some other issues related to this study constrain interpretation of its findings and suggest avenues for future research. First, as noted, only single-product firms were included. I did this to provide a different perspective from that of previous research on large multidivisional firms, but the present departures from previous research suggest that my findings should not be overinterpreted. Future research should examine a broader range of postures to isolate the differences in administrative contexts and human resource management practices used.

A second limitation of this study is that it only focused on executives. Although interrater reliabilities showed significant convergence among executives in single firms, suggesting they used the same pattern of controls, this study revealed nothing about what lower-level managers in those firms did by way of human resource management. Research by Schuler and Jackson (1989) has suggested that human resource practices may vary below the level of vice president, so the effects of strategic context and administrative information may also vary. Future research might investigate whether strategic human resource management is a concept that applies only to executives or one that can depict the overall activities of a firm.

Third, I used primarily perceptual measures to measure theoretical constructs. There was thus no way to test adequately for the representativeness of the firms studied or for nonresponse bias. Though I took extra care to ensure construct validity by pilot-testing the measures and assessing internal consistency and interrater reliability, future research could benefit from the use of more objective data. Although some constructs, such as cause-effect knowledge, are inherently perceptual, others (strategy and technology) could be measured using archival data. At a minimum, this practice would avoid percept-percept problems.

Fourth, future research might try to refine the constructs and operational definition of human resource management control. In the present study, for example, items related to feedback—an important element of

control—did not distinguish the three types. In addition, it was not possible to distinguish formal behavior control (the focus of this study) from informal behavior control (cf. Hitt et al., 1990). Of the three types, behavior control had the highest mean rating (4.99) among executives, but it is unlikely that they completely formalize and standardize the procedures used by their subordinate managers. Future research that isolates these operational subtleties would be especially valuable.

Finally, the construct domain for input control also remains unclear. Future research might investigate whether selection and training practices are best conceived as input controls, as Jaeger and Baliga (1985) suggested, or as more closely associated with behavior control (Govindarajan & Fisher, 1990) or clan control (Ouchi, 1979). As stated at the outset, researchers have developed many different frameworks to describe both control (e.g., Kerr, 1985; Ouchi, 1977, 1980; Rackham & Woodward, 1970; Tannenbaum, 1968) and strategic human resource management (e.g., Ferris et al., 1984; Miles & Snow, 1984; Schuler, 1989). This study focused only on bureaucratic mechanisms because they best represent the essence of human resource management. However, human resource practices probably fall into other control categories as well. Ouchi (1979), for example, discussed selection and training in the context of both bureaucratic and clan mechanisms. Similarly, behavior and output control can be viewed as both bureaucratic and market mechanisms (Jaeger & Baliga, 1985; Ouchi, 1979). Finally, Govindarajan and Fisher (1990) argued that socialization control is actually behavior control. Clearly, research is needed to differentiate these constructs.

Conclusion

An increasing number of authors have argued that human resource management practices should be aligned with the competitive postures of firms (cf. Lengnick-Hall & Lengnick-Hall, 1988). This focus on strategic management represents a fundamental shift in the human resource research agenda, away from models of individual behavior and toward theories of organization (Mahoney & Deckop, 1986). Progress in strategic human resource management therefore requires interdisciplinary research. Unfortunately, the overwhelming majority of work to date has been conceptual, an understandable focus, given the emerging nature of the topic. But as Fisher (1989) pointed out, although ideas and anecdotes certainly have merit, the truest test comes through empirical research. This study tested a model complementary to the behavioral perspective on strategic human resource management. The findings are directly useful to human resource researchers, and others interested in strategy and control might find them useful as well. At their root, the distinctions between strategy, control, and human resource management are becoming less obvious (Goold & Quinn, 1990; Jaeger & Baliga, 1985). Examining their integration offers many potential benefits for the field of management.
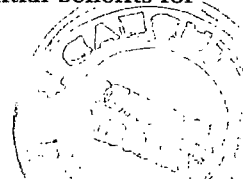
REFERENCES

Argote, L. 1982. Input uncertainty and organizational coordination in hospital emergency units. *Administrative Science Quarterly*, 27: 420–434.

Baird, L. R., & Meshoulam, I. 1987. Managing two fits of strategic human resource management. *Academy of Management Review*, 13: 116–128.

Balkin, D. B., & Gomez-Mejia, L. R. 1987. Toward a contingency theory of compensation strategy. *Strategic Management Journal*, 8: 169–182.

Baron, R. M., & Kenny, D. A. 1986. The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology*, 51: 1173–1182.

Boulding, K. E. 1956. General systems theory—The skeleton of science. *Management Science*, 2: 197–208.

Boyd, B. 1990. Corporate linkages and organizational environment: A test of the resource dependence model. *Strategic Management Journal*, 11: 419–430.

Brass, D. J. 1981. Structural relationships, job characteristics, and worker satisfaction and performance. *Administrative Science Quarterly*, 26: 331–348.

Brass, D. J. 1985. Technology and the structuring of jobs: Employee satisfaction, performance and influence. *Organizational Behavior and Human Decision Processes*, 35: 216–240.

Chandler, A. D. 1962. *Strategy and structure: Chapters in the history of American industrial enterprise.* Cambridge, MA: MIT Press.

Cheng, J. L. C., & McKinley, W. 1983. Toward an integration of organization research and practice: A contingency study of bureaucratic control and performance in scientific settings. *Administrative Science Quarterly*, 29: 85–100.

Child, J. 1973. Strategies of control and organizational behavior. *Administrative Science Quarterly*, 18: 1–17.

Child, J. 1974. Predicting and understanding organization structure. *Administrative Science Quarterly*, 19: 168–185.

Cohen, J., & Cohen, P. 1983. *Applied multiple regression/correlation analysis for the behavioral sciences.* Hillsdale, NJ: Erlbaum.

Dean, J. W., Jr., & Snell, S. A. 1991. Integrated manufacturing and job design: Moderating effects of organizational inertia. *Academy of Management Journal*, 34: 776–804.

Dess, G. G., Ireland, R. D., & Hitt, M. A. 1990. Industry effects and strategic management research. *Journal of Management*, 16(1): 7–27.

Egelhoff, W. G. 1982. Strategy and structure in multinational corporations: An information-processing approach. *Administrative Science Quarterly*, 27: 435–458.

Eisenhardt, K. M. 1985. Control: Organizational and economic approaches. *Management Science*, 31: 134–149.

Ferris, G. R., Schellenberg, D. A., & Zammuto, R. F. 1984. Human resource management in declining industries. *Human Resource Management*, 23: 381–394.

Flamholtz, E. G. 1979. Organizational control systems as a managerial tool. *California Management Review*, 22(2): 50–59.

Fisher, C. D. 1989. Current and recurrent challenges in HRM. *Journal of Management*, 15(2): 157–180.

Galbraith, J. 1973. *Designing complex organizations.* Reading, MA: Addison-Wesley.

Goold, M., & Quinn, J. J. 1990. The paradox of strategic goals. *Strategic Management Journal*, 11: 43–57.

Govindarajan, V., & Fisher, F. 1990. Strategy, control systems, and resource sharing: Effects on business-unit performance. *Academy of Management Journal*, 33: 259–285.

Gupta, A. K. 1987. SBU strategies, corporate-SBU relations, and SBU effectiveness in strategy implementation. *Academy of Management Journal*, 30: 477–500.

Gupta, A. K., & Govindarajan, V. 1984. Business unit strategy, managerial characteristics, and business unit effectiveness at strategy implementation. *Academy of Management Journal*, 27: 25–41.

Hambrick, D. C. 1983. High profit strategies in mature capital goods industries: A contingency approach. *Academy of Management Journal*, 26: 687–707.

Harrigan, K. R. 1983. Research methodologies for contingency approaches to business strategy. *Academy of Management Review*, 8: 398–405.

Herfindahl, O. C. 1950. *Concentration in the steel industry.* Ph.D. dissertation, Columbia University.

Hill, C. W. L., & Hoskisson, R. E. 1987. Strategy and structure in multiproduct firms. *Academy of Management Review*, 12: 331–341.

Hirschman, A. O. 1945. *National power and the structure of foreign trade.* Berkeley: University of California Press.

Hitt, M. A., Hoskisson, R. E., & Ireland, R. D. 1990. Mergers and acquisitions and managerial commitment to innovation in M-form firms. *Strategic Management Journal*, 11 (special issue): 29–47.

Hofstede, G. 1978. The poverty of management control philosophy. *Academy of Management Review*, 3: 450–461.

Hoskisson, R. E., & Hitt, M. A. 1988. Strategic control and relative R&D investment in large multiproduct firms. *Strategic Management Journal*, 9: 605–621.

Hrebiniak, L. G. 1978. *Complex organizations.* St. Paul: West Publishing.

Inkson, J. H. K., Pugh, D. S., & Hickson, D. J. 1970. Organization context and structure: An abbreviated replication. *Administrative Science Quarterly*, 15: 318–329.

Jackson, S. E., Schuler, R. S., & Rivero, J. C. 1989. Organizational characteristics as predictors of personnel practices. *Personnel Psychology*, 42: 727–785.

Jaeger, A. M., & Baliga, B. R. 1985. Control systems and strategic adaptation: Lessons from the Japanese experience. *Strategic Management Journal*, 6: 115–134.

James, L. R., & Brett, J. M. 1984. Mediators, moderators and tests for mediation. *Journal of Applied Psychology*, 69: 307–321.

James, L. R., Demaree, R. G., & Wolf, G. 1984. Estimating within-group interrater reliability with and without response bias. *Journal of Applied Psychology*, 69: 85–98.

Jones, G. R. 1984. Task visibility, free riding, and shirking: Explaining the effect of structure and technology on employee behavior. *Academy of Management Review*, 9: 684–695.

Kane, J. S., & Lawler, E. E. 1979. Performance appraisal effectiveness: Its assessment and determinants. In B. M. Staw (Ed.), *Research in organizational behavior,* vol. 1: 425–478. Greenwich, CT: JAI Press.

Keats, B. W., & Hitt, M. A. 1988. A causal model of linkages among environmental dimensions, macro organizational characteristics, and performance. *Academy of Management Journal*, 31: 570–598.

Keefe, J. H., & Katz, H. C. 1990. Job classifications and plant performance in the auto industry. *Industrial Relations*, 29: 111–118.

Kerr, J. L. 1985. Diversification strategies and managerial rewards: An empirical study. *Academy of Management Journal*, 28: 155–179.

Khandwalla, P. N. 1973. Effect of competition on the structure of top management control. *Academy of Management Journal,* 16: 285–295.

Khandwalla, P. N. 1974. Mass output orientation of operations technology and organization structure. *Administrative Science Quarterly,* 19: 74–97.

Kimberly, J. R. 1976. Organizational size and the structuralist perspective: A review, critique, and proposal. *Administrative Science Quarterly,* 21: 571–597.

Lawler, E. E., III, & Rhode, J. G. 1976. *Information and control in organizations.* Pacific Palisades, CA: Goodyear.

Lengnick-Hall, C. A., & Lengnick-Hall, M. L. 1988. Strategic human resources management: A review of the literature and a proposed typology. *Academy of Management Review,* 13: 454–470.

Litterer, J. A. 1965. *The analysis of organizations.* New York: Wiley.

Lorsch, J. W., & Allen, A. 1973. *Managing diversity and interdependence: An organizational study of multi-dimensional firms.* Boston: Division of Research, Harvard University Graduate School of Business Administration.

Mahoney, T. A. 1979. Organizational hierarchy and position worth. *Academy of Management Journal,* 22: 726–737.

Mahoney, T. A., & Deckop, J. R. 1986. Evolution of concept and practice in personnel administration/human resource management. *Journal of Management,* 12(2): 223–241.

Majchrzak, A. 1988. *The human side of factory automation.* San Francisco: Jossey-Bass.

March, J. G., & Simon, H. A. 1958. *Organizations.* New York: Wiley.

Michael, D. N. 1973. *On learning to plan—and planning to learn.* San Francisco: Jossey-Bass.

Miles, R. E., & Snow, C. C. 1978. *Organization strategy, structure and process.* New York: McGraw-Hill.

Miles, R. E., & Snow, C. C. 1984. Designing strategic human resource management systems. *Organization Dynamics,* 13(1): 36–52.

Mintzberg, H. 1979. *The structure of organizations.* Englewood Cliffs, NJ: Prentice-Hall.

Murthy, K. R. S., & Salter, M. S. 1975. Should CEO pay be linked to results? *Harvard Business Review,* 53(3): 66–73.

Nunnally, J. C. 1978. *Psychometric theory.* New York: McGraw-Hill.

O'Reilly, C. A. 1982. Variations in decision makers' use of information sources: The impact of quality and accessibility of information. *Academy of Management Journal,* 25: 756–771.

Ouchi, W. G. 1977. The relationship between organizational structure and organizational control. *Administrative Science Quarterly,* 20: 95–113.

Ouchi, W. G. 1978. The transmission of control through organizational hierarchy. *Administrative Science Quarterly,* 21: 173–192.

Ouchi, W. G. 1979. A conceptual framework for the design of organizational control mechanisms. *Administrative Science Quarterly,* 24: 833–848.

Ouchi, W. G. 1980. Markets, bureaucracies and clans. *Administrative Science Quarterly,* 25: 129–141.

Ouchi, W. G., & Maguire, M. A. 1975. Organization control: Two functions. *Administrative Science Quarterly,* 20: 559–569.

Perrow, C. B. 1967. A framework for the comparative analysis of organizations. *American Sociological Review,* 32: 194–208.

Pitts, R. A. 1976. Diversification strategies and organizational policies of large diversified firms. *Journal of Economics and Business,* 28(3): 181–188.

Quinn, J. B. 1977. Strategic goals: Process and politics. *Sloan Management Review,* 19(1): 21–37.

Rackham, J., & Woodward, J. 1970. The measurement of technical variables. In J. Woodward (Ed.), *Industrial organization: Behavior and control:* 19–36. London: Oxford.

Rappaport, A. 1978. Executive incentives vs. corporate growth. *Harvard Business Review,* 56(3): 28–46.

Reeves, T. K., & Woodward, J. 1970. The study of managerial controls. In J. Woodward (Ed.), *Industrial organization: Behavior and control:* 37–56. London: Oxford.

Rumelt, R. P. 1974. *Strategy, structure, and economic performance.* Boston: Division of Research, Harvard University Graduate School of Business Administration.

Samuel, Y., & Mannheim, B. F. 1970. Multidimensional approach toward a typology of bureaucracy. *Administrative Science Quarterly,* 15: 216–228.

Schmalensee, R. 1977. Using the H-index of concentration with published data. *Review of Economics and Statistics,* 59: 186–213.

Schmitt, N. W., & Klimoski, R. J. 1991. *Research methods in human resources management.* Cincinnati: South-Western.

Schuler, R. S. 1989. Strategic human resource management and industrial relations. *Human Relations,* 42: 157–184.

Schuler, R. S., & Jackson, S. A. 1989. Determinants of human resource management priorities and implications for industrial relations. *Journal of Management,* 15: 89–99.

Snell, S. A., & Dean, J. W., Jr. 1990. The match between human resources management and advanced manufacturing processes. *Academy of Management Best Papers Proceedings,* 41: 294–298.

Snow, C. C., & Hrebiniak, L. G. 1980. Strategy, distinctive competence, and organizational performance. *Administrative Science Quarterly,* 25: 317–335.

Stone, E. F., & Hollenbeck, J. R. 1989. Clarifying some controversial issues surrounding statistical procedures for detecting moderator variables: Empirical evidence and related matters. *Journal of Applied Psychology,* 74: 3–10.

Tannenbaum, A. S. 1968. *The social psychology of work organization.* Belmont, CA: Brooks-Cole.

Thomas, J. B., & McDaniel, R. R. 1990. Strategic issue interpretation: The effects of strategy and information-processing structure of top management teams. *Academy of Management Journal,* 33: 286–306.

Thompson, J. D. 1967. *Organizations in action.* New York: McGraw-Hill.

Tichy, N. M., Fombrun, C. J., & Devanna, M. A. 1982. Strategic human resource management. *Sloan Management Review,* 23(2): 41–61.

Turcotte, W. E. 1974. Control systems, performance and satisfaction in two state agencies. *Administrative Science Quarterly,* 19: 60–73.

Van de Ven, A. H., Delbecq, A. L., & Koenig, R., Jr. 1976. Determinants of coordination modes within organizations. *American Sociological Review,* 41: 322–338.

Walsh, J. P., & Seward, J. K. 1990. On the efficiency of internal and external corporate control mechanisms. *Academy of Management Review,* 15: 421–458.

Williamson, O. 1975. *Markets and hierarchies.* New York: Free Press.

APPENDIX

Questionnaire Items Developed for This Research[a]

Product-market variation

1. Our firm offers a narrow range of products (R).
2. Our firm establishes and maintains a stable product-market posture (R).
3. When our customers purchase, they tend to buy many different things.
4. Our firm is at the forefront of innovation and development.
5. The characteristics of our products differ a great deal from one another.
6. Our firm sells to a wide variety of customers.
7. The needs of our customers are very similar to one another (R).
8. Our firm offers many different services to customers.
9. Our business procedures have changed several times in past years.
10. The characteristics of our products are modified frequently.
11. The needs of our customers vary quite a bit from one year to the next.

Knowledge of cause-effect relations

1. I can distinguish between effective and ineffective managers by watching actions on the job.
2. I cannot usually observe most of the duties my subordinate managers perform (R).
3. I am not in a position to see exactly what actions my managers take to achieve the results they do (R).
4. The relationship between the actions my subordinates take and the outcomes they achieve is stable over time.
5. My subordinates must often act in different ways to achieve the same outcome (R).
6. It is difficult to predict in advance how successful managers will be as a consequence of the actions they take (R).

Crystallized standards of desirable performance

1. Standards of desirable performance are well defined.
2. I have several sources of objective data available that indicate how well each of my subordinates is performing.
3. Results measures accurately depict how well my subordinates have performed.
4. My managers do not perform jobs for which there are quantifiable measures (R).
5. Goals and objectives for my subordinates are ambiguous (R).

Input control

1. Managers receive substantial training before they assume responsibility.
2. We have gone to great lengths to establish the best staffing procedure possible.
3. After being on the job for years, managers are involved in skill development.
4. Individuals must undergo a series of evaluations before they are hired.
5. My managers are given ample opportunity to broaden their range of talents.
6. We take pride in the fact that we hire the very best people for a job.
7. We have a strong commitment to training and developing skilled managers.

Behavior control

1. Primary weight in evaluations is placed on behavior.
2. Subordinates are held accountable for their actions, regardless of results.
3. I do not generally concern myself with particular procedures and methods my subordinates use on the job (R).
4. My managers and I consult with one another in setting standards (R).
5. Performance programs are imposed top-down.
6. Frequent meetings are held with subordinates to discuss their performance.
7. Subordinates assume responsibility for setting their own performance goals (R).
8. Members of this organization receive frequent performance feedback.
9. Long lag periods are required for feedback (R).

Output control
1. Performance evaluations place primary weight on results.
2. Performance targets are written in stone (R).
3. Pay consists of performance-based rewards.
4. Pre-established targets are used as a benchmark for evaluations.
5. Numerical records are used as the chief index of effectiveness.
6. Differences in pay among my subordinates represent differences in performance levels.
7. Regardless of what subordinates are like personally, their performance is judged by results achieved.
8. The rewards my managers receive are linked to results.
9. It is infeasible to lock my subordinates into fixed targets.
10. My team of managers is paid on straight salary (R).
11. Those who do not reach objectives receive a low rating.
12. Regardless of their absolute accomplishments, appraisals are based on whether they reach their goals.

[a] R indicates a reverse-coded item.

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ORGANIZATIONAL RESPONSES TO LEGAL LIABILITY: EMPLOYEE EXPOSURE TO HAZARDOUS MATERIALS, VERTICAL INTEGRATION, AND SMALL FIRM PRODUCTION

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Organizations face an increasingly litigious environment. We examined responses to one class of legal threats: liability stemming from employees' on-the-job exposure to hazardous materials. We empirically investigated the impact of such exposure on the vertical integration of firms and on the percentage change in the number of small firms in an industry. In the face of legal exposure, firms are more likely to adopt a nonvertically integrated production system, and small firm production in an industry increases. These actions reduce the liability of large firms. Incentives for small firms to produce in this context are also discussed.

Both the popular business press (*Forbes*, 1982; *Barron's*, 1986) and legal research (Trubek, Sarat, Felstiner, Dritzer, & Grossman, 1983) have suggested that organizations face an increasingly litigious environment. Legal judgments are becoming a significant component of the cost of doing business for many firms (*Fortune*, 1986). Indeed, in some circumstances, legal actions have forced otherwise financially healthy firms like Texaco Incorporated (Sherman, 1987) and the Manville Corporation (Epstein, 1984) into bankruptcy. Understanding the strategies that firms use to reduce the threat of legal liability has become an increasingly important area of research (Harrigan, 1983; Ringleb & Wiggins, 1988).

This study examined responses to legal liability stemming from employees' on-the-job exposure to hazardous materials. In the United States, employees so exposed, or their heirs, have the right to compensation from their employer if the exposure can be shown to have led to disease, disability, or death. Firms have been sued for exposing workers to health risks associated with asbestos, dioxin, vinyl chloride, PCB, benzidine, and a variety of other chemicals and substances (Ashford, 1976; Page & O'Brien, 1973; Stellman &

Duam, 1973). Our assumption was that adopting a vertically integrated production process exposes a firm to high levels of such liability. Empirically, this idea suggests that firms facing potential risks from employee exposure to hazardous materials will, other things being equal, be less vertically integrated than firms not facing such risks.

THEORY

Vertically Integrated Production and Legal Liability

Firms adopt a vertically integrated production process for a wide variety of reasons (cf. Harrigan, 1984, 1986; Pfeffer & Salancik, 1978; Williamson, 1985). In the present context, vertically integrated production has the advantage of increasing a firm's direct control of the production process (Williamson, 1985). A firm can invest in allegedly safe manufacturing technologies, develop and implement strict work rules, and so forth. The direct control that stems from vertical integration facilitates such actions, each of which reduces the probability of employee on-the-job exposure to hazardous materials and the potential liability associated with that exposure.

However, reductions in liability stemming from vertical integration are likely to be more than offset by the legal liability that vertical integration into a hazardous process creates. Even if firms commit themselves to very high safety standards and make substantial investments in protecting workers, accidents and other unforeseen events can occur, especially when the manufacturing technologies in question are complex (Perrow, 1984; Roe, 1984; Schwartz, 1985; Shrivastiva, 1987). If unforeseen events lead to worker exposure to hazardous materials that cause disease, disability, or death, a firm is liable for these consequences because the exposure occurred while the firm was vertically integrated into the problematic manufacturing process. In these circumstances, all of a firm's assets can be used to pay judgments against it. If judgments are very large, as they were in the Manville case, virtually all of a firm's assets will have to be liquidated (Epstein, 1984). Smaller judgments may not force a total liquidation but can nevertheless adversely affect economic performance (Burnett, 1985).

Vertical integration is further complicated by uncertainty surrounding hazards employees experience on the job. Hazards have sometimes manifested themselves 40 years after worker exposure (Armenien & Lilienfeld, 1974). Management cannot know what controls to use to prevent exposure to unclear hazards. The managerial control associated with vertical integration into a potentially hazardous manufacturing process thus brings few advantages to a firm and may subject it to significant legal liability.

Nonvertically Integrated Production and Liability

A production organization that is not vertically integrated enjoys freedom from many of the limitations noted. If the managers of a large corporation suspect that the production of a new material may be hazardous and thus expose the firm to liability, they may instead encourage several smaller

corporations to produce the material.[1] The small corporations accept the legal liability associated with production, but the large corporation can still obtain and use the hazardous material.

Allied Chemicals' use of the Life Science Products Company to manufacture Kepone provides one example of how a large corporation thus protected itself:

> In the late 1940s, a chemist for Allied invented a compound commonly known as Kepone, which is used in the manufacture of various insecticides and pesticides. For reasons which are in dispute, Allied eventually decided to terminate its production of Kepone and "go outside" for its Kepone requirements. On November 30, 1973, Allied executed an agreement with Life Science Products Company (LSP) for the production of Kepone. Under the agreement, Allied agreed to provide LSP with all the necessary raw materials which LSP would process and convert into Kepone. Allied agreed to receive the finished product in drums supplied by Allied at LSP's plant and to pay for certain quantities of the Kepone produced. Title to all raw materials and to the Kepone produced at LSP remained at all times in Allied Chemical.
>
> The two principals and sole stockholders of LSP were plaintiffs William P. Moore and Virgil Hundtofte. Prior to his retirement, Moore worked as an inorganic chemist for Allied twenty-seven years. Hundtofte worked for Allied from 1965 to 1973; for three years, he was plant manager at Allied's Hopewell plant (*Moore v. Allied Chemical*, 1979).

Given these facts, and with evidence of significant worker injury due to workplace exposures at the Life Science Products Company, the court found LSP liable. The $4.8 million judgment could not be satisfied, however, because the company had only $32 in assets (*Wall Street Journal*, 1976). A subsequent suit against Allied was unsuccessful, with the court ruling that as an independent contractor, Allied was not liable for worker injuries at the smaller company. The facts seem to portray an intimate contractual relationship that had the effect of shielding Allied from liability generated by the manufacture of Kepone.

Production Incentives for Small Corporations

Of course, for nonvertically integrated production to protect a large corporation from liability, the managers of small corporations must be willing to produce a suspected hazardous material knowing that production will transfer liability from the large corporation to themselves. The incentives for

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[1] Sometimes, organizations may not become aware of potential hazards until after they have adopted vertically integrated production. In this case, firms will weigh the possible liability consequences of a hazard and vertical integration against the difficulties of changing established procedures in adopting a nonvertically integrated production process. If the hazards are great enough, vertical integration may be abandoned.

small corporations to engage in a hazardous production process vary depending upon whether or not a suspected process turns out to in fact be hazardous.

First, it may turn out that a process suspected of exposing employees to hazardous materials does not involve such exposure. Arms-length market relations between small corporations making the materials in question and a large corporation purchasing those materials may then continue for some time. During this time, the small corporations will likely be quite profitable, for they are manufacturing a product with known demand and customers. Once the production process has been demonstrated to be not hazardous, the large corporation might decide to vertically integrate into it on the basis of transaction cost (Williamson, 1975), resource dependence (Pfeffer & Salancik, 1978), or strategic considerations (Harrigan, 1985). However, until it does so, the small production corporations can be a source of substantial profits for their owners.

Second, it may turn out that a production process does in fact expose workers to hazardous materials. Such exposure is likely to lead to employee injuries that in turn lead to legal liabilities that threaten the survival of the small corporations. However, between the time these companies begin production and the time liability drives them into bankruptcy, they can earn substantial profits for their owners. Moreover, the length of time during which they can earn these profits can be substantial, sometimes over 40 years (Armenian & Lilienfeld, 1974); it will be at least as long as it takes to establish a causal connection between on-the-job exposure and injury in a court of law.[2]

During this period, managers have a strong incentive to keep the economic value of their firms' total assets small if they suspect a material to be hazardous. Once a hazard is demonstrated in the courts, these small corporations can declare Chapter 13 bankruptcy, and their total assets will be distributed to injured parties. But limited liability rules apply, and the personal wealth of their managers and owners is not at risk (Epstein, 1984). If the assets of these corporations are kept very small, injured parties will not be fully compensated, and the financial damage to the owners will be minimal. It is unlikely that large corporations will be held liable for injuries suffered by employees of the smaller corporations, for the larger firms are simply customers of the smaller ones.

Corporations can use a variety of techniques to keep the value of their assets small. They can purchase only used manufacturing equipment, minimize their investment in buildings, adopt accelerated depreciation schedules, lease most of their plant and equipment, and pay their managers very

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[2] Establishing a causal connection between on-the-job exposure and injury in a court of law requires more than demonstrating that particular substances can cause injury. Advocates must also demonstrate that exposure to these hazards caused the injuries in question by ruling out other exposures to hazardous materials that may not have occurred on the job as primary causes of the injuries.

high salaries. None of these actions is illegal, nor do they necessarily restrict a small corporation's sales or profitability. Moreover, they all increase the wealth of the small corporation's owners and managers while reducing the dollar size of the liability the company faces should it be forced into bankruptcy.

Limitations of Nonvertically Integrated Production

There are, of course, several limitations on the ability of large corporations to use nonvertically integrated production to reduce their liability. First, large corporations can only encourage small corporations to begin a production process. They cannot directly fund their founding. If a large corporation invested directly in a small one, the courts would likely conclude that the smaller was a subsidiary of the larger and hold the latter liable for damages resulting from the small corporation's activities (e.g., *New Jersey v. Ventron Corporation*, U.S. Government Works, 468 A.2d 150). However, a large corporation can give a small corporation long-term sales contracts that guarantee that the large corporation will purchase specific amounts of material at a set price over a period of time. Such sales contracts, which are not unique to the relationship between large corporations and these kinds of small corporations (Williamson, 1979), do not obscure the independent legal status of these corporate entities.

Second, when there are substantial economies of scale in a production process, nonvertical integration will probably generate significant economic inefficiencies for a large corporation. Management will weigh the cost of these inefficiencies against the cost of future liabilities in determining whether nonvertically integrated production is appropriate or not. Moreover, a process with substantial economies of scale is likely to generate producers with moderate, or even large, asset bases. Such firms have many assets at risk should the production process in question prove to be hazardous and will thus be an important source of compensation for injured parties. Such firms are less likely than the small corporations just discussed to begin hazardous production, for in so doing they would place substantial financial assets at risk.

A final limitation of this strategy may be the inability of large firms to find small corporations willing to undertake a production process suspected of generating health hazards. This limitation, however, does not seem likely to exist in most settings. First, the small corporations would have an already established market. Indeed, they may be able to obtain long-term supplier contracts with the large firms they will sell to as a condition of beginning production. Thus, their start-up business risks are considerably smaller than the similar risks smaller firms normally manage (Hannan & Freeman, 1989). Second, bankruptcy will probably only occur if a production process turns out to be hazardous, and even then it may not occur for decades. The potential for strong financial performance during that interval is likely to be very attractive. Finally, a large firm may not be able to locate managers who, for moral or ethical reasons, are willing to operate a production process that

has potential health risks associated with it. However, given the substantial economic rewards associated with such a business, the lack of such managers does not seem likely to be a real constraint in most industries.

Thus, as long as an arms-length relationship with small suppliers is maintained, as long as scale economies are not prohibitive, and as long as moral or ethical concerns do not prevail, a large corporation can use non-vertically integrated production to protect itself from liabilities resulting from worker injuries caused by on-the-job exposure to hazardous substances. Moreover, it can do so while continuing to purchase and use the hazardous material in question.

HYPOTHESES

The threat of liability stemming from employee on-the-job exposure to hazardous materials will have at least two simultaneous effects. First, it leads large corporations facing significant risks of this sort to adopt a production system that is not vertically integrated. Second, it creates incentives for small corporations to begin producing the hazardous materials in question. In examining the relationships between the threat of liability, vertical integration, and small firm production, we also considered other, possibly confounding, variables.

Vertical Integration

The model examined here was built on previous research on the determinants of vertical integration and our arguments concerning legal liability. The variables included are: (1) a corporation's potential liability due to employee on-the-job exposure to hazardous materials, (2) its past level of vertical integration, (3) the level of technological uncertainty it faces, (4) the level of its market's concentration, and (5) the level of uncertainty in demand it faces.

Legal liability. Our observations concerning legal liability lead to the following:

> *Hypothesis 1a: The threat of legal liability to an organization stemming from employee on-the-job exposure to hazardous materials is negatively associated with its level of vertical integration.*

Past level of vertical integration. The past level of a firm's vertical integration reflects management's views on what level is appropriate on the basis of such criteria as transaction costs (Williamson, 1975), resource dependence (Pfeffer & Salancik, 1978), and strategic considerations (Harrigan, 1984, 1986). Moreover, several authors have suggested that established operational policies and procedures become self-perpetuating (e.g., Nelson & Winter, 1982), reflecting organizational and managerial inertia (Hannan &

Freeman, 1977). Organizations can change their policies and practices in the face of new information, but inertia affects both the speed and direction of that change. Decisions about vertical integration made in response to legal liability take place in the context of a firm's past.

> Hypothesis 1b: An organization's past level of vertical
> integration is positively associated with its current level
> of vertical integration.

Technological uncertainty. Walker and Weber (1984) argued that the level of technological uncertainty facing a firm is positively associated with vertical integration because the "administrative costs of managing the interfaces between in-house engineering, purchasing, and outside suppliers may become higher than the administrative costs incurred in coordinating an internal engineering and production effort" (Walker & Weber, 1984: 376). To avoid these transaction costs and to facilitate the development of cooperative relations between engineers, purchasers, and suppliers, organizations facing high technological uncertainty will vertically integrate.

> Hypothesis 1c: The level of technological uncertainty
> facing an organization is positively associated with its
> level of vertical integration.

Market concentration. Harrigan (1984, 1985) argued that the concentration of a firm's market will be positively associated with its level of vertical integration because competition is less volatile in highly concentrated markets than in less concentrated markets (Porter, 1980). When competition is highly volatile, organizations are less likely to commit themselves to vertically integrated forms of production that limit their options should strategic changes be required. When competition is less volatile, firms can make long-term commitments to vertical integration and thereby obtain its transaction cost, resource dependence, or strategic advantages.

> Hypothesis 1d: The level of concentration of a firm's in-
> dustry is positively associated with its level of vertical
> integration.

Demand uncertainty. Balakrishnan and Wernerfelt (1986) argued that high uncertainty in the demand for a firm's products will be negatively associated with its level of vertical integration. Following Harrigan (1984), they suggested that firms in very uncertain businesses have a strong incentive to maintain their ability to respond to environmental changes as they occur. Vertical integration limits flexibility and thus will only be adopted in relatively certain demand situations.

> Hypothesis 1e: The level of demand uncertainty facing a
> firm will be negatively associated with its level of vertical
> integration.

It is interesting to note that there is a strong argument against Hypothesis

1e. Walker and Weber (1984) argued that high uncertainty in demand will be positively associated with vertical integration. They noted that since high demand uncertainty may bring large sales fluctuations over time, nonvertically integrated suppliers can experience shortages or excess inventory. Firms purchasing from these suppliers must constantly renegotiate their contracts. Rather than accept the transaction costs of renegotiation, Walker and Weber suggested firms in a highly uncertain environment may vertically integrate.

Although renegotiating with suppliers may be costly, it seems likely that in most situations the ability to maintain flexibility in the face of demand uncertainty will dominate the need to reduce renegotiation costs. By maintaining flexibility, organizations can move with relatively low cost to the most appropriate level of vertical integration.

Small Firm Production

In our model of small firm production, the percentage change in the number of small firms producing in an industry depends upon (1) the potential legal liability of firms in that industry resulting from employee on-the-job exposure to hazardous materials, (2) industry growth, (3) industry concentration, and (4) the relative costs of energy for small and large firms in the industry.

Legal liability. As suggested earlier, small firms have a strong incentive to produce in an industry facing high levels of potential liability. In the short and medium term, such production is likely to be very profitable as the small firms manufacture and sell products with a known demand and known customers. If the production process they engage in turns out not to expose employees to hazardous materials, they can continue in this business for some time. If employees are exposed to hazardous materials and those exposures are shown in court to cause harm, these small firms will be held liable. However, by keeping the economic value of their assets small, the firms' owners can keep the impact of this liability on their wealth negligible. These observations lead to the second primary hypothesis of this study:

> *Hypothesis 2a: The threat of legal liability due to employee on-the-job exposure to hazardous materials is positively associated with the percentage change in the number of small firms in that industry.*

Industry growth. The impact of industry growth on the increase in the percentage of small firms in an industry has been well documented (Mansfield, 1962; Orr, 1974). It is often less costly for firms to acquire customers in fast-growing industries than it is for them to do so in slow-growing or declining industries (Bhagwati, 1970; George, 1968; Sylos-Labini, 1962). Fast-growing industries thus will usually attract firms. Small firms in particular may be attracted to such industries because growth often creates new product or geographic niches that small firms can quickly move to fill (Scherer, 1980). The flexibility of small firms may allow them to take advantage of

opportunities in growing industries that larger firms either do not see or are not sufficiently flexible to exploit (Hannan & Freeman, 1989).

>*Hypothesis 2b: The growth of an industry is positively associated with the percentage change in the number of small firms in that industry.*

Industry concentration. Previous research has also suggested that concentrated industries present more opportunities for small firms than less concentrated industries, even if large firms in these industries are highly vertically integrated (Hypothesis 1d; cf. Bain, 1956; Scherer, 1980). On the average, the performance of incumbent firms in highly concentrated industries is higher than the performance of firms in less concentrated industries. Both large and small firms seeking to obtain a high level of performance are likely to be attracted to concentrated industries. Moreover, domination of an industry by a few large firms suggests that there may be room for numerous smaller fringe firms to exist as independent business entities, though not necessarily as suppliers to large vertically integrated firms (Gaskins, 1971; Scherer, 1980). Fringe firms can exploit market opportunities that are too small to add significantly to the value of large firms.

>*Hypothesis 2c: The level of concentration of an industry is positively associated with the percentage change in the number of small firms in that industry.*

Energy costs. In many of the industries in this study, energy costs are a significant portion of the cost of doing business. If large firms employ more energy-intensive technology than small firms, the latter will have an incentive to begin production during periods of rapidly escalating energy costs. Small firms, with their simpler technologies and production operations, may enjoy an energy cost advantage.

>*Hypothesis 2d: Higher energy costs for large firms than for small firms in an industry are positively associated with the percentage change in the number of small firms in that industry.*

METHODS

The dependent variables in the vertical integration and small firm production models were measured at different levels of analysis: vertical integration is a firm-level variable, and the percentage change in the number of small firms is an industry-level variable. For this reason, we examined the hypotheses focusing on the two dependent variables separately. The two models share an independent variable, the threat of legal liability stemming from employee exposure to hazardous materials.

In the early 1970s, the federal government commissioned a study (Hickey & Kearney, 1978) to determine the percentages of employees in 19 two-digit Standard Industrial Classification (SIC) code industries that were

exposed to hazardous materials while on the job. Hickey and Kearney defined an employee as having been exposed to hazardous materials on the job if that person came into direct, physical contact over a prolonged period with one or more known carcinogenic or co-carcinogenic substances while at work. They cited medical opinions that such exposures subject workers to significantly higher risks of developing various forms of cancer and other diseases than workers not so exposed incur. From the point of view of the legal liability of firms, these exposures increase the probability that employees will become injured and that the cause of these injuries will be traced to on-the-job exposures. Once proven in a court of law, such exposures will lead the firms within which they took place to be held financially liable. We assumed that the greater the percentage of employees in an industry exposed to hazardous materials while on the job, the greater the threat of legal liability to firms in that industry.

Although the Hickey and Kearney data are the best available on the percentages of employees exposed to hazardous materials, like all data they have limitations. The most important limitation for this study is that the data only cover 19 two-digit industries. These industries range widely, including food and kindred products, petroleum and coal products, and electrical machinery (SIC codes 20 through 38). Hickey and Kearney chose these because medical research indicated they were the SIC industries in which employee on-the-job exposures to hazardous materials were the most common (Hickey & Kearney, 1978). Thus, these industries present conditions under which the phenomena discussed here, including the adoption of non-vertically integrated production and movement toward small firm production, are likely to exist.

Vertical Integration Model

Firms. To estimate the vertical integration model, we analyzed all firms in the 19 two-digit-SIC-code industries studied by Hickey and Kearney (1978) that had data on the research files distributed by COMPUSTAT Services with which we could compute the independent and dependent variables. There were 105 such firms.

Measures. The dependent variable, *vertical integration*, was measured as the ratio of value added to sales. We used the adjusted form of this measure originally proposed by Adelman (1955) and applied by Gort (1962), Nelson (1963), Laffer (1969), Tucker and Wilder (1978), and, in modified form, Harrigan (1986).[3] Expressed as a percentage of a firm's sales, value added measures the portion of a firm's business revenues generated by activities conducted within the boundaries of the firm. A firm with a high ratio between value added and sales has brought many of the value-creating activities associated with its business inside its boundaries (Adelman, 1955;

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[3] Scherer (1980) reviews the related literature.

Williamson, 1985), consistent with a high level of vertical integration. A firm with a low value-added-to-sales ratio is assumed not to have a high level of vertical integration. Thus, value added, as a percentage of firm sales, is an indirect measure of level of vertical integration. Additional work by Maddigan (1979) has suggested that this approach to measuring vertical integration is appropriate under a wide range of situations.

Here, we defined vertical integration in year i as the ratio of value added to sales in that year. To control for inflation and changes in the tax code over time, this value-added measure was adjusted as follows:

$$vertical\ integration_i = \frac{value\ added_i - (net\ income_i + income\ taxes_i)}{sales_i - (net\ income_i + income\ taxes_i)}.$$

The information about firm sales, net income, and income taxes in 1976 needed to compute this measure of vertical integration was obtained for firms in industries in which data on employee on-the-job exposure to hazardous materials had been collected (Hickey & Kearney, 1978). Following Tucker and Wilder (1978), we computed value added for these firms by summing the following variables: depreciation, amortization, fixed charges, interest expense, labor and related expense, pension and retirement expense, income taxes, net income (after taxes), and rental expenses. We chose the year 1976 because it was the year during which the Hickey and Kearney (1978) data were collected. To test Hypothesis 1a, we examined the relationship between legal liability from employee on-the-job exposure to hazardous materials, as measured by the Hickey and Kearney data, and this value-added measure of vertical integration.

For Hypothesis 1b, we measured *past level of vertical integration* again using the value-added-to-sales ratio. We included level of vertical integration in 1970 as an independent variable. Several other years were included in the model specification without affecting results.

For Hypothesis 1c, we measured *technological uncertainty* by computing the change in R&D spending in a firm's industry from 1970 to 1976. The greater the change in R&D spending, the greater the technological uncertainty facing a firm.

For Hypothesis 1d, we measured *industry concentration* using a four-firm concentration ratio for each of the industries included in Hickey and Kearney's (1978) study. The Census of Manufacturers reports four-firm concentration ratios for four-digit SIC codes (U.S. Bureau of the Census, 1977: 912–958). To compute concentration ratios for the two-digit SIC codes included in Hickey and Kearney, we weighted each four-digit measure of industry concentration by the value of shipments in 1976 for all four-digit industries included within a two-digit industry. Then, we computed the weighted average of these four-digit concentration ratios and used it as an estimate of the concentration of the two-digit industries.

Finally, for tests of Hypothesis 1e, we measured *demand uncertainty* as

the variance in industry sales from 1970 to 1976. The greater this variance in sales, the greater the uncertainty in demand facing a firm.[4]

Analysis. The vertical integration model was estimated using ordinary least squares (OLS) regression analysis. We found that the distribution of all the independent variables for this model, except past level of vertical integration and industry concentration, significantly deviated from normality. To correct that problem, we logarithmically transformed these variables.

Small Firm Production Model

Preliminary research. Before testing the small firm production model with secondary data, we visited some small corporations specializing in the manufacture of hazardous materials to obtain a sense of what it is like to conduct business in this context. Although those visits did not constitute rigorous research, they were nevertheless instructive.

It became clear that many of the objectives of more traditional small businesses—including the establishment of legitimacy (Zucker, 1977)—are less relevant for the kinds of small corporations in this study. The owners of these corporations create them knowing that, some day, they may expose their employees to hazardous materials and thus be held liable. The organizations we visited were in rural areas with high levels of unemployment, and they drew on a relatively uneducated labor force. Their buildings and facilities were typically very crude: prefabricated metal structures, Quonset huts, unpaved parking lots, and so forth. Informal conversations with employees indicated that they knew the work they were doing might be hazardous. However, they said they were being paid well, considerably better than they would be at possible alternative jobs, and thus were reluctant to "rock the boat" by working for safety improvements. Armed with this qualitative experience, we then turned to the test of the small firm production model using secondary data.

Firms. Although the Hickey and Kearney (1978) study included 19 two-digit-SIC-code industries, we excluded two of those industries from this analysis. One exclusion was the petroleum and coal products industry. Regulation during the study period artificially promoted small firm production beyond the level that would otherwise have been expected, given traditional economic reasoning (Senate Subcommittee on Antitrust and Monopoly, 1978). The tobacco industry was the second exclusion; legal confidentiality constraints prevent the Internal Revenue Service (the source of data for our dependent variable) from disclosing information on small corporations in this industry.

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[4] We focused on environment as a determinant of vertical integration, following Harrigan (1985). However, it is possible to restate the model and focus on firm-level determinants. We did that for the 105 firms by substituting changes in firm R&D for changes in industry R&D, firm market share for industry concentration, and variance in firm sales for variance in industry sales. The results of an OLS regression analysis were consistent with those reported here, as were the results of a combined firm level and environmental model. Both alternate models are available from the first author.

Measures. We measured the *percentage change in the number of small firms in an industry* by subtracting the number of firms in an industry with assets of less than $100,000 in 1967 from the number of such firms (defined in constant 1967 dollars) in an industry in 1980 and expressing the result as a percentage of these firms in 1967. We obtained needed data from the Department of Treasury (U.S. Internal Revenue Service, 1968, 1980). The $100,000 limit was small enough to ensure that the firms in question would not have significant assets at risk should they be forced to liquidate as a result of legal actions brought against them. We chose the end of this data series (1980) to allow small firms enough time to respond to any vertical integration decisions made by large corporations as the large corporations became aware of Hickey and Kearney's (1978) findings. Hypothesis 2a examines the relationship between legal liability from employee on-the-job exposure to hazardous materials and the percentage change in the number of small firms in an industry.

For tests of Hypothesis 2b, we calculated *industry growth* as the percentage differences in value added by industry for each two-digit SIC code included in the Hickey and Kearney study between 1967 and 1978. We obtained needed data from the 1978 Annual Survey of Manufacturers (U.S. Bureau of the Census, 1978: 8).

For Hypothesis 2c, we measured *industry concentration* using the four-firm concentration ratio of each of the industries included in the Hickey and Kearney (1978) study. It was calculated exactly like industry concentration in the vertical integration model but for 1977 instead of 1978, because 1978 concentration data were not available. However, it seems very likely that the degree of concentration in the industries studied would not vary significantly in a single year (Scherer, 1980).

Relative energy costs were calculated as the ratio of the cost of fuels and electric energy, expressed as a percentage of the value of industry shipments in 1975 for companies with fewer than 250 employees, to these costs for companies with more than 250 employees. These data have only been published once, in Pashigan (1984). Thus, it was not possible to obtain a measure of relative energy costs of small and large firms in 1978, although Pashigan (1984) and others (e.g., Scherer, 1980) have suggested that this ratio is likely to remain quite stable over a few years.

Analysis. The small firm production model was also estimated using OLS regression analysis. There were no deviations from normality in the independent variables for this model.

RESULTS

Vertical Integration Model

Table 1 presents means, standard deviations, and intercorrelations for variables in the vertical integration model. Table 2 presents unstandardized regression coefficients for the estimated model.

Results support our primary hypothesis, Hypothesis 1a, examining li-

TABLE 1
Means, Standard Deviations, and Intercorrelations: Vertical Integration Model[a]

Variables	Means	s.d.	1	2	3	4	5	6
1. Vertical integration	0.39	0.11						
2. Past vertical integration	0.43	0.10	.87***					
3. Technological uncertainty[b]	8.18	1.51	−.05	−.03				
4. Industry concentration	0.34	0.11	.04	.10	.13			
5. Demand uncertainty[b]	10.75	3.15	−.54***	−.44***	−.64***	−.05		
6. Legal liability[b]	3.74	1.26	−.23**	−.09	.41***	.33***	.38**	

[a] $N = 105$.
[b] The value for this variable was a logarithm.
    * $p < .05$
  ** $p < .01$
*** $p < .001$

TABLE 2
Results of Regression Analysis: Vertical Integration Model

Independent Variables		b	Standard Error	t
Legal liability[a]		−.01	.004	−2.68***
Past vertical integration		.80	.054	14.77***
Technological uncertainty[a]		.02	.004	3.78***
Industry concentration		−.04	.044	−0.83
Demand uncertainty[a]		−.02	.003	−4.69***
R^2	.83			
Adjusted R^2	.82			
N	105			
F	95.849***			

[a] The value for this variable was a logarithm.
   * $p < .05$
  ** $p < .01$
*** $p < .001$

ability and vertical integration. In addition, Hypotheses 1b (past level of vertical integration and vertical integration), 1c (technological uncertainty and vertical integration), and 1e (demand uncertainty and vertical integration) were also supported. Only the coefficient for the test of Hypothesis 1d (industry concentration and vertical integration) is not statistically significant.

Small Firm Production Model

Table 3 gives means, standard deviations, and intercorrelations for variables in the small firm production model. Table 4 presents unstandardized regression coefficients for the estimated model.

Results for the small firm production model support the primary hypothesis of interest, Hypothesis 2a, examining liability and small firm production. In addition, Hypothesis 2d (relative energy costs and small firm production) was also supported. And although the coefficients for the tests of Hypotheses 2b (industry growth and small firm production) and 2c (industry concentration and small firm production) are not significant, they do have the anticipated signs.

Thus, controlling for the impact of past levels of vertical integration, technological uncertainty, industry concentration, and demand uncertainty on vertical integration in an industry, we found that the level of vertical integration adopted by a firm is negatively associated with the threat of liability to the firm that is due to employee on-the-job exposure to hazardous materials. Also, controlling for the impact of industry growth, industry concentration, and the relative energy costs for small and large firms on small firm production, we found that the level of threat due to employee exposure to hazardous materials is positively associated with the percentage change in the number of small firms in an industry. Both findings are consistent with the theory of legal liability, vertical integration, and small firm production we have developed.

Limitations

The reported research is limited in at least two important ways. First, although the measures of vertical integration, small firm production, and legal liability we used have been shown to be reasonable surrogates for our theoretical concepts, future research should attempt to use more direct mea-

TABLE 3
Means, Standard Deviations, and Intercorrelations:
Small Firm Production Model[a]

Variables	Means	s.d.	1	2	3	4	5
Percentage change of small firms in industry	−11.33	34.48					
Industry growth	158.55	52.75	.34				
Industry concentration	0.34	0.15	.30	−.00			
Relative energy costs	0.85	0.28	.51*	.03	.15		
Legal liability	55.59	83.35	.55*	.16	.30	.10	

    [a] $N = 105$.
    * $p < .05$

TABLE 4
Results of Regression Analysis: Small Firm Production Model

Independent Variables		b	Standard Error	t
Legal liability		0.20	0.09	2.11*
Industry growth		0.19	0.13	1.52
Industry concentration		10.89	46.06	0.24
Relative energy costs		55.46	25.68	2.25*
R^2	.55			
Adjusted R^2	.40			
N	17			
F	3.716*			

* $p < .05$

sures of these phenomena. In particular, more direct measures of vertical integration, like those used by Harrigan (1985) and Maddigan (1979), may help further understanding of the vertical integration decision.

More important, although this research is based on the assumption that managers in large firms intentionally use nonvertically integrated production to shift legal liability from themselves to smaller corporations, we have not tested this intentionality directly. Indeed, since the admission of the intention to avoid liability could be used in a court of law to establish the culpability of large corporations, it is unlikely that managers in large corporations would freely admit to the motivations described here. Only if researchers could legally guarantee their anonymity might these managers be willing to come forward.

If researchers could obtain direct evidence of the motivations of managers in this context, the researchers themselves would then face serious ethical dilemmas. Not disclosing evidence about managerial intentions might enable researchers to study those intentions, and legal guarantees needed to obtain this information may evolve; but failure to disclose these intentions in a court of law might mean that injured workers would not be fully compensated. The ethical challenges this type of research poses are discussed in more detail below.

DISCUSSION

The reported research has implications for the study of vertical integration, small firm production, the impact of the legal environment on organizational decisions, and ethical issues in organizational research.

Determinants of Vertical Integration

In examining the determinants of vertical integration, we have shed light on several controversies and raised others. For example, we have addressed an apparent conflict between Harrigan (1984) and Balakrishnan and

Wernerfelt (1985), on the one hand, and Walker and Weber (1984) on the other. These authors have disagreed on the relationship between demand uncertainty and vertical integration. In this study, the flexibility advantages associated with less vertical integration apparently outweighed the transaction cost advantages of more vertical integration. Future research needs to explicitly discuss the conditions under which the flexibility and transaction cost arguments each apply. Also, despite Harrigan's (1984) findings that industry concentration was an important determinant of vertical integration, the present research found no significant relationship. This lack of relationship perhaps reflects the relatively high level of aggregation at which we measured industry concentration (two-digit SIC codes). Future work needs to examine this relationship at a lower level of aggregation.

Determinants of Small Firm Production

Previous predictions about small firm production have received, overall, more consistent support (Bhagwati, 1970; Gaskins, 1971; Pashisan, 1984). In this study, industry growth and industry concentration did not have statistically significant coefficients, perhaps reflecting the small number of industries used in estimating the equation. Again, adopting a lower level of aggregation would help in future research.

The Legal Environment and Organizational Decisions

The legal issues discussed here both challenge and extend previous work on vertical integration and small firm production. First, this work suggests that analyses of the causes and consequences of vertical integration are incomplete if they do not encompass the potential impact of legal liability. Transaction cost (Williamson, 1975), resource dependence (Pfeffer & Salancik, 1978), and other analyses (Harrigan, 1985) may still be very important for managers making vertical integration decisions, but those models apparently operate within a broad legal liability context. Other things being equal, the threat of liability will lead firms to be less vertically integrated than would otherwise be the case. When an investigator finds less vertical integration than expected (e.g., Walker & Weber, 1984), legal liability may be a possible explanation.

Second, this research has implications for the analysis of the performance of small firms. Previous work has noted both important strengths and weaknesses of small firms. On the strengths side, researchers have described small firms as flexible, able to respond quickly to environmental opportunities and threats, and unencumbered by the bureaucratic structures of larger firms (Anderson, 1988; Schumpeter, 1942). On the weakness side, a great deal of work has focused on the liability of newness small firms suffer (e.g., Freeman, Carroll, & Hannan, 1983; Singh, Tucker, & House, 1986).

The present research points to a whole new range of strengths and weaknesses of a special class of small firms. For these firms, an important

strength is that they are small—or more precisely, that the total assets they have at risk in a legal action are small. In a sense, these organizations are designed to some day go out of business. Issues such as legitimacy, long-run survival, and stable managerial policies are probably less important than the wealth that they generate for their owners for understanding the performance of these firms.

More generally, this discussion of vertical integration and small firm production points to the importance of integrating insights from law and legal analysis into organizational analysis. Several organizational scholars have called for this type of research in the past (e.g., Harrigan, 1983; Scherer, 1980; Williamson, 1979). Indeed, virtually every introductory organizational theory and management textbook cites the importance of the legal environment facing organizations. However, much organizational research remains relatively naive about the organizational implications of the law. Several bodies of law seem likely to affect and constrain organizational actions, including tax laws, laws about equal access and opportunity, product liability law, antitrust law, criminal law, and the employee hazards law discussed in this article. A significant challenge facing organizational scholars is to become sufficiently familiar with these bodies of law that they can anticipate their implications for the organizational phenomena under study.

However, calling for organizational research that integrates organizational and legal analyses is not the same as providing the theoretical framework for accomplishing that integration. We analyzed only an example, albeit an important one, of this general class of problem in the hope that this research will motivate other work that will ultimately lead to the called-for theoretical integration.

Ethical Issues in Organizational Research

Finally, the research reported here presents some significant ethical dilemmas for both organizational researchers and society as a whole. For organizational researchers, the ethical challenges of this kind of work are perhaps best summarized by a story. When the first author of this article gave a draft to his secretary to type, she refused to do so, arguing that the publication of this work would encourage both large and small firms to engage in the activities described here. Her view was that those activities were immoral and would lead to the exposure of numerous employees to hazardous materials. She wanted no part of this research and was appalled that we, as researchers, would be party to the death, disease, and inadequate compensation that could result from this work.

Although we could sympathize with our secretary's views, in the end we convinced her to work on the manuscript because (1) we were studying decisions that had already been made and (2) its publication might be helpful in resolving the legal and organizational issues it raises. However, her objection made us reevaluate our ideas. Should we (or could we) be objective scientific researchers and simply describe the relationship between legal

liability, vertical integration, and small firm production, or should we be more proactive and argue for changes in the current legal system? We have attempted to remain as objective as possible and simply describe the phenomena we observed. We are not, however, completely comfortable with this solution. The phenomena we have described will lead to both the exposure of numerous employees in small corporations to hazardous materials and the inability of these employees to receive compensation for their injuries. These outcomes are, for us, unacceptable.

In the end, remaining objective and describing these phenomena scientifically may lead to their resolution. But perhaps analysis will not lead to any resolution. In any case, such ethical dilemmas seem very likely to crop up more frequently as organizational researchers continue to integrate legal analyses into their work. Such research does not just address important scientific questions like "What is going on?" and "Is this theory correct or incorrect?" but inevitably addresses questions of right and wrong, good and bad, legal and illegal behavior. We are glad our secretary finally agreed to type the manuscript but would have understood if she had refused.

At a broader level, the reported research also poses important dilemmas for society and its current system of liability laws. There is, upon reflection, no easy solution to the problem of employee on-the-job exposure to hazardous materials. Two obvious solutions—banning the production of all hazardous materials and requiring safety precautions in the handling of these materials—are not likely to be fully effective because there is often a significant lag between the development of new materials and the discovery of their hazardous character. A third alternative, requiring large firms to pay compensation for injuries suffered in small firms, raises difficult legal issues: When is an arms-length relationship really not an arms-length relationship? Certainly, if it can be shown that the intent of a large firm is to transfer liability, the large firm can be held liable. However, proving intent in a court of law can be very difficult. Future research may be able to address this intentionality but will entail the serious ethical dilemmas for researchers mentioned earlier.

Finally, if large firms were required by law to remain vertically integrated in all their production activities, significant production inefficiencies might occur (Williamson, 1975). The cost of those inefficiencies must be weighed against the benefits of having large firms as "deep pockets" to compensate injured employees. Moreover, using large firms to compensate injured employees has its own costs. One need only read of the unemployment and life disruptions associated with the bankruptcy of the Manville Corporation (Epstein, 1984) to recognize that forcing a large corporation to pay for mass employee injuries has its own forms of personal and social cost.

We have no simple answers for these ethical questions, only the observation that it is becoming increasingly important that organizational scholars become parties in the social policy dialogue that addresses such organization-based ethical issues.

REFERENCES

Adelman, M. A. 1955. Concept and statistical measurement of vertical integration. In National Bureau for Economic Research (Eds.), *Business concentration and price policy:* 281–322. Princeton, NJ: Princeton University Press.

Anderson, P. 1988. The population dynamics of Schumpetarian competition. *Academy of Management Best Papers Proceedings:* 150–154.

Armenian, H. K., & Lilienfeld, A. 1974. The distribution of incubation periods of neoplastic diseases. *American Journal of Epidemiology,* 99(1): 92–100.

Ashford, N. 1976. The magnitude of the occupational health problem. In Congressional Joint Subcommittee on Labor, 94th Congress, 2d Session, *Proceedings of the interdepartmental workers' compensation task force conference on occupational disease and workers' compensation:* Washington, DC: US Government Printing Office.

Bain, J. 1956. *Barriers to new competition.* Cambridge, MA: Harvard University Press.

Balakrishnan, C., & Wernerfelt, B. 1986. Technical change, competition, and vertical integration. *Strategic Management Journal,* 7: 347–359.

Barron's. 1986. A plague of lawyers. 66(November 17): 38–39.

Bhagwati, J. W. 1970. Oligopoly theory, entry prevention, and growth. *Oxford Economic Papers,* 22(3): 297–310.

Burnett, B. P. 1985. A plaintiff's view of structured settlement in personal injury litigation. *Colorado Lawyer,* 14: 1960–1967.

Epstein, R. A. 1984. The legal and insurance dynamics of mass tort litigation. *Journal of Legal Studies,* 13: 475–506.

Forbes. 1982. Who, and where do I sue? 135(April 12): 64–65.

Fortune. 1986. When products turn. 115(March 3): 20–24.

Freeman, J., Carroll, G., & Hannan, M. 1983. The liability of newness: Age dependence in organizational death rates. *American Sociological Review,* 48: 692–710.

Gaskins, D. W. 1971. Dynamic limit pricing: Optimal pricing under threat of entry. *Journal of Economic Theory,* 3: 306–322.

George, D. D. 1968. Concentration, barriers to entry, and rates of return. *Review of Economics and Statistics,* 50: 273–305.

Gort, M. 1962. *Diversification and integration in American industry.* Princeton, NJ: Princeton University Press.

Hannan, M. T., & Freeman, J. 1977. The population ecology of organizations. *American Journal of Sociology,* 82: 929–964.

Hannan, M. T., & Freeman, J. 1989. *Organizational ecology.* Cambridge, MA: Harvard University Press.

Harrigan, K. 1983. *Strategies for vertical integration.* Lexington, MA: Lexington Books.

Harrigan, K. 1984. Formulating vertical integration strategies. *Academy of Management Review,* 9: 638–652.

Harrigan, K. 1986. Matching vertical integration strategies to competitive conditions. *Strategic Management Journal,* 7: 535–555.

Hickey, J. L. S., & Kearney, J. J. 1978. *Engineering control research and development plan for carcinogenic materials.* Cincinnati: National Institute for Occupational Safety and Health.

Laffer, A. 1969. Vertical integration by corporations: 1929–1965. *Review of Economics and Statistics,* 51: 91–93.

Maddigan, R. 1979. *The impact of vertical integration on business performance.* Unpublished dissertation, Graduate School of Business, Indiana University at Bloomington.

Mansfield, E. 1962. Entry, Gilbrat's law, innovation and growth of firms. *American Economic Review,* 52: 1023–1050.

Moore v. Allied Chemical. 1979. 480 Federal Supplement: 364–377.

Nelson, R., & Winter, S. 1982. *An evolutionary theory of economic change.* Cambridge, MA: Harvard University Press.

Nelson, R. L. 1963. *Concentration in the manufacturing industries of the United States.* New Haven: Yale University Press.

Orr, D. 1974. The determinants of entry: A study of the Canadian manufacturing industries. *Review of Economics and Statistics,* 56: 58–66.

Page, J. A., & O'Brien, M. W. 1973. *Bitter wages.* New York: Grossman.

Pashigan, P. 1984. The effect of environmental regulation on optimal plant size and factor shares. *Journal of Law and Economics,* 27(1): 1–33.

Perrow, C. 1984. *Normal accidents.* New York: Basic Books.

Pfeffer, J., & Salancik, G. 1978. *The external control of organizations: A resource dependence perspective.* New York: Harper.

Porter, M. 1980. *Competitive strategy.* New York: Free Press.

Ringleb, A., & Wiggins, S. 1988. *Liability and mass latent hazards.* Unpublished manuscript, Departments of Management and Economics, Texas A&M University, College Station, Texas.

Roe, M. J. 1984. Bankruptcy and mass tort. *Columbia Law Review,* 84: 846–849.

Scherer, F. M. 1980. *Industrial market structure and economic performance* (2d ed.). Boston: Houghton Mifflin.

Schumpeter, J. 1942. *Capitalism, socialism, and democracy.* New York: Harper & Row.

Schwartz, A. 1985. Product liability, corporate structure, and bankruptcy: Toxic substances and the remote risk relationship. *Journal of Legal Studies,* 14: 689–750.

Senate Subcommittee on Antitrust and Monopoly. 1978. The small refiner bias proposal to reduce small refiner bias in the entitlements program. *Federal Register,* 43: 54, 652.

Sherman, S. P. 1987. The gambler who refused $2 billion. *Fortune,* 116(May 11): 50.

Shrivastiva, P. 1987. *Bhopal: Anatomy of a crisis.* Cambridge, MA: Ballinger.

Singh, J., Tucker, R., & House, R. 1986. Organizational legitimacy and the liability of newness. *Administrative Science Quarterly,* 31: 171–193.

Stellman, J. M., & Duam, S. M. 1973. *Work is dangerous to your health.* New York: Vintage Books.

Sylos-Labini, P. 1962. *Oligopoly and technical progress* (E. Henderson, trans.). Cambridge, MA: Harvard University Press.

Trubeck, D. M., Sarat, A., Felstiner, W. L. F., Kritzer, H. M., & Grossman, J. B. 1983. The costs of ordinary litigation. *UCLA Law Review,* 31(1): 72–127.

Tucker, I., & Wilder, R. P. 1977. Trends in vertical integration in the U.S. manufacturing sector. *Journal of Industrial Economics,* 26: 81–94.

U.S. Bureau of the Census. 1978. *Annual survey of manufacturers.* Washington, DC: U.S. Department of Commerce.

U.S. Internal Revenue Service. 1968. *1968 statistics of income.* Washington, DC: U.S. Department of the Treasury.

U.S. Internal Revenue Service. 1980. *Source book of statistics of income.* Washington, DC: U.S. Department of the Treasury.

Walker, G., & Weber, D. 1984. A transaction cost approach to make or buy. *Administrative Science Quarterly.* 29: 373–391.

Wall Street Journal. 1976. Allied Chemical gets Kepone fine of $13.3 million. October 6: 2.

Williamson, O. E. 1975. *Markets and hierarchies.* New York: Free Press.

Williamson, O. E. 1979. Transaction cost economics: The governance of contractual relations. *Journal of Law and Economics,* 22(2): 233–261.

Williamson, O. E. 1985. *The economic institutions of capitalism.* New York: Free Press.

Zucker, L. 1977. The role of institutionalization in cultural persistence. *American Sociological Review,* 42: 726–743.

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ELECTRONIC BRAINSTORMING AND GROUP SIZE

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Two concurrent experiments were conducted with groups of varying size; there were 2-, 4-, and 6-person groups in one and 6- and 12-person groups in the other. We compared the number and quality of unique ideas generated by groups of each size using electronic and nonelectronic, verbal brainstorming. Groups used both techniques in a counterbalanced within-group design. The larger groups in both experiments generated more unique ideas and more high-quality ideas, and members were more satisfied when they used electronic brainstorming than when they used verbal brainstorming. There were fewer differences between the two techniques for the smaller groups in each experiment. We interpret these results as showing that electronic brainstorming reduces the effects of production blocking and evaluation apprehension on group performance, particularly for large groups.

One of the more common tasks for groups in organizations is generating ideas. Design teams, marketing groups, task forces, and program committees are all examples of organizational groups that generate ideas. Because of the importance of idea generation, a great deal of effort has been devoted to finding techniques that can help the process work more effectively. Brainstorming, a group idea-generation technique that has been used for over 35 years, is widespread. It has high face validity, its rules are easy to under-

stand, and many participants experience the kind of synergy that is supposed to be the technique's main advantage. That is, some people do hear ideas that prompt them to think of other ideas of which they might not have otherwise thought. As a result, brainstorming has strong appeal as a way for groups to generate ideas.

One problem with traditional brainstorming is that large groups typically do not generate more ideas than small groups, and it has become generally accepted that large brainstorming groups are not productive. This research investigated a technique called electronic brainstorming and attempted to determine if it can more effectively support the idea generation tasks of both large and small groups than the traditional brainstorming technique.

BRAINSTORMING

The history of research on brainstorming consists of two distinct streams. The first assesses the effectiveness of the original brainstorming technique, and the second tests a variety of newer methods of idea generation. Both streams owe their origins to the 1954 publication of Osborn's *Applied Imagination*. Osborn described the group brainstorming technique and presented persuasive examples of how brainstorming could be used to help groups generate ideas. His central theme was that groups can generate more ideas if their members concentrate on producing whatever ideas occur to them while avoiding evaluation of their own and other's ideas. Evaluation is to be done at a later stage.

Taylor, Berry, and Block (1958) launched the first type of research by testing Osborn's claim that groups using brainstorming could generate more ideas than the same number of individuals working separately, a configuration that those authors named a "nominal group." This stream was strongest in the 1960s and dissipated in the late 1970s, by which time researchers had lost interest in repeated demonstrations that brainstorming groups produced fewer nonredundant ideas than did equivalently sized nominal groups.

A secondary question within this stream was whether group size made a difference in the effectiveness of brainstorming groups. Osborn argued that brainstorming was most effective for groups of up to 12 members. Leading research journals have published seven group-size studies of brainstorming (Bouchard, Drauden, & Barsaloux, 1974a,b; Bouchard & Hare, 1971; Fern, 1982; Hackman & Vidmar, 1970; Lewis, Sadosky, & Connolly, 1975; Renzulli, Owen, & Callahan, 1974). All of the preceding except Renzulli and colleagues (1974) found that large groups did not generate more ideas than small groups. Renzulli and colleagues found that 12-member groups did generate more ideas than 3-member groups. All seven studies found that the number of ideas generated per person declined as the size of the group increased. Thus, there is consensus from this first stream of research that brainstorming groups do not outperform their nominal group counterparts and that the marginal productivity of members of brainstorming groups declines as groups grow larger.

The second stream of research focuses on the development and testing of new techniques for idea generation. Many structured techniques have been developed, including the delphi technique and the nominal group technique (which differs from nominal groups as they are defined above; cf. Delbecq, Van de Ven, & Gustafson, 1975; Van Gundy, 1981, 1987). Many studies have been published comparing the effectiveness of these techniques to Osborn's brainstorming technique. Although some studies have shown that these structured techniques can improve idea generation, most have found that groups using them do not generate more ideas than groups using traditional brainstorming or unstructured group interaction (e.g., Hegedus & Rasmussen, 1985; Jablin & Seibold, 1978; Lamm & Trommsdorff, 1973).

Research has suggested two primary reasons why nominal groups outperform interacting groups, structured idea generation techniques provide little advantage over unstructured interaction, and large groups do not generate more ideas than small groups (e.g., Diehl & Stroebe, 1987; Jablin & Seibold, 1978; Lamm & Trommsdorff, 1973). The two problems identified are production blocking and evaluation apprehension. Production blocking occurs when individuals cannot express their ideas because someone else is talking. Thus, production blocking can cancel out or override the synergistic effects that brainstorming is supposed to produce. This problem can be overcome if group members can simultaneously produce their ideas. Evaluation apprehension occurs when individuals withhold their ideas out of concern that others may not approve of them. The lack of anonymity in brainstorming groups reduces the likelihood that novel ideas will be generated. Evaluation apprehension may be particularly likely to occur for low-status members of groups that include dominant, high-status members. It can be overcome by ensuring anonymity. In addition to production blocking and evaluation apprehension, other inhibitors, such as social loafing (Latané, Williams, & Harkins, 1979), may be likely present in brainstorming group interaction. Moreover, the magnitude of inhibitors may grow as group size increases (Steiner, 1972).

ELECTRONIC BRAINSTORMING

The research reported in this study continued the second stream of research on brainstorming by examining a new technique, electronic brainstorming, while returning to the group-size issue important in the first stream. In electronic brainstorming, group members can simultaneously type ideas into a computer that then distributes the ideas to the screens of other group members.[1] Our experience with electronic brainstorming is that members access the ideas produced by the group, particularly when they run out of ideas. Although interaction in the form of verbal comments and ex-

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[1] Electronic brainstorming was implemented using an electronic meeting-support system called the University of Arizona GroupSystems. See Nunamaker and colleagues (1991) for more information.

pressions of affect is absent, there is interaction in that people build on the ideas of co-members and combine their ideas with others'. Because of this interaction, electronic brainstorming resembles traditional brainstorming without having its drawbacks.

The electronic brainstorming process combines an aspect of the nominal group process—being able to generate ideas at will—and an aspect of the traditional brainstorming process: being able to share ideas with others. Synergy can occur in electronic brainstorming groups through the sharing of ideas by way of the computer screen. Observations and participants' comments after the electronic brainstorming sessions in a previous brainstorming study (Gallupe, Bastianutti, & Cooper, 1991) indicated that the participants were not distracted by the ideas on the screen. They seemed to process these ideas very fast, studying them when they could not think of another idea on their own. Observations made in the previous study indicated that individuals generated a number of ideas quickly at the start of a session, then experienced a lull during which they seemed to be processing other group members' ideas. Another burst of idea generation, smaller than the first, follows, then another lull occurs. This process is repeated until the session ends.

Electronic brainstorming may reduce the effects of production blocking because, since members can work simultaneously, they are not blocked from contributing ideas. Furthermore, all ideas are anonymous, which may reduce the inhibiting effects of evaluation apprehension (Connolly, Jessup, & Valacich, 1990). Indeed, Gallupe and colleagues (1991) showed that 4-person electronic brainstorming groups outperformed verbal brainstorming groups of the same size. Our questions in the present research were whether the superiority of electronic brainstorming groups would increase with group size, and whether the electronic advantage would decrease for groups smaller than 4 members.

Because production blocking and evaluation apprehension are likely to increase with group size for nonelectronic brainstorming groups, but not for electronic brainstorming groups, we expected that the superiority of electronic brainstorming would grow as group size increased. Indirect support for this prediction is found in Dennis, Valacich, and Nunamaker (1990); they found that 18-member electronic brainstorming groups generated more ideas than 9-member electronic brainstorming groups, which in turn generated more ideas than 3-member electronic brainstorming groups. This support is only indirect because no nonelectronic brainstorming groups were used for comparison. Our expectations about a group-size effect were based on six of the seven previous studies of nonelectronic brainstorming and group size. These studies did not find an effect for group size and, accordingly, we did not expect to find a difference in productivity linked to group size. We express our expectations in two hypotheses:

> *Hypothesis 1: Electronic brainstorming groups will outperform nonelectronic brainstorming groups for all sizes of groups. That is, technology will have a main effect.*

>　*Hypothesis 2: There will be no difference in the productivity of nonelectronic brainstorming groups of different sizes, but large electronic brainstorming groups will be more productive than small ones. That is, the interaction of technology and group size will be significant.*

This study, which builds on and extends the work of Gallupe, Dennis, and their respective colleagues, was part of an ongoing research program on electronic brainstorming conducted at Queen's University and the University of Arizona. Gallupe and colleagues' study, the initial experiment to determine if electronic brainstorming was better than traditional brainstorming for groups of a fixed size (4 people), was the first study to compare technologically unsupported brainstorming groups with supported groups. It used small groups and therefore may not have demonstrated the true potential of electronic brainstorming. Dennis and colleagues only compared supported groups of varying sizes and did not include baseline unsupported groups to allow direct comparisons on the tasks the groups were given. We designed the present study to address those deficits.

Two experiments were conducted concurrently to examine the effects of computer-mediated technology and group size on the productivity of brainstorming groups. We conducted the two experiments using the same design, technology, and procedures in two different settings: the Queen's University Decision Lab in Kingston, Ontario, and the Park Student Center Lab at the University of Arizona in Tucson. Experiment 1 (the Queen's experiment) used three group sizes (2, 4, and 6 members) and experiment 2 (the Arizona experiment) used two group sizes (6 and 12 members). We report the Queen's experiment first.

EXPERIMENT 1

Methods

Subjects. One hundred twenty undergraduate students (60 men and 60 women) enrolled in an organizational behavior course at Queen's University participated for partial course credit. Their mean age was 19.8 years. None had previously participated in a brainstorming study. Ten groups of each of the three sizes were studied; groups contained equal numbers of men and women.

Task. Two questions were used. One was a variant on the traditional tourism problem: "How can tourism be improved in Kingston?" The second was "How can campus security be improved at Queen's?" In addition, we used two practice questions: "What benefits and difficulties would occur if everyone grew an extra thumb on each hand?" and "What are some uses for a knife?"

Treatments. The two independent variables were group size and technology. We used a fully balanced repeated measures design. All groups performed both tasks. Half answered the tourism question first and half

answered it last. All groups brainstormed using both electronic and non-electronic brainstorming. Half the groups used electronic brainstorming first, and half used it last. During electronic brainstorming, group members entered ideas by typing them at individual computer work stations. Every time a group member entered an idea, another set of ideas that had been generated by members of the group appeared on the individual's screen. In addition, a group member could simply press the F10 key to see additional ideas without entering an idea. In contrast, during the nonelectronic brainstorming, group members simply said their ideas out loud. These were recorded on a single tape deck for subsequent transcription.

The three group sizes were chosen because they allowed a feasible test of the hypotheses, and previous brainstorming studies have used groups of these sizes (cf. Diehl & Stroebe, 1987,1991; Dennis, Nunamaker, & Vogel, 1991). We assigned subjects to groups based on their availability and assigned groups randomly to treatments.

Procedures. When subjects arrived at the Queen's University Decision Lab, they were seated around a U-shaped table at individual work stations, each consisting of a color monitor, keyboard, and microphone. An experimenter (one of four men and two women) then introduced himself or herself and each member of the group. After the subjects had signed a consent form and an agreement of confidentiality, they completed a presession questionnaire that assessed their age, prior computer experience, self-reported keyboarding speed, and attitudes toward working in groups and using computers. We collected the presession data as a check on the effectiveness of the random assignment to groups. The experimenter then explained the upcoming sequence of events and described the rules for brainstorming: the more ideas the better, the wilder the ideas the better, combine and modify previous ideas, and don't criticize ideas. Bouchard and Hare (1970) and Osborn (1954) give details of the rules we used.

The subjects then brainstormed one of the two randomly assigned practice problems for 5 minutes, using the technology they would use for the first main problem. After the brainstorming rules were reviewed, they received the first of the two randomly assigned main problems (campus security or tourism). Groups had 15 minutes to generate ideas. A postsession questionnaire was then administered to assess members' perceptions of production blocking, evaluation apprehension, and satisfaction.

After introduction of the technology the group would use for the second main problem, members brainstormed the second practice question for 5 minutes. Procedures were again reviewed, and the group then brainstormed the second main problem for 15 minutes. Experimenters then administered a second, identical postsession questionnaire, thanked subjects for their participation, and dismissed them. All subjects received a written debriefing.

Dependent variables. The primary dependent variable for this experiment was the number of nonredundant ideas each group produced. The ideas of all groups were typed in identical formats for subsequent coding. An

experienced coder who was both treatment- and hypotheses-blind assessed the number of nonredundant ideas each group had produced using the coding rules of Bouchard and Hare (1970). A second coder, who was trained via a coding manual co-written by the experienced coder (Cooper, Bastianutti, Young, Gallupe, & McCallum, 1991), then rated the 60 group outputs. The level of interrater agreement was high ($r = .96$). The experienced coder's ratings were used as the measure of the main dependent variable.

Previous research on traditional brainstorming has failed to show differences in the quality of the ideas produced by brainstorming and nonbrainstorming groups. Quality may not have differed because the instructions given to the participants emphasized generating as many ideas as possible rather than producing ideas of high quality. We decided to assess the quality of ideas because the electronic brainstorming technology is new, and the anonymity it provides may affect quality. The same two coders who rated the numbers of ideas also assessed their quality, using the same method as Diehl and Stroebe (1987). Each group's nonredundant ideas were rated for originality and feasibility on five-point scales, and the two coders' ratings were defined as being in agreement if they were within one point of each other. The two raters agreed in 95 percent of the originality ratings and 93 percent of the feasibility ratings. We averaged the two ratings to produce a quality score on a five-point scale and determined an overall quality score by summing the average ratings for the unique ideas generated by each group. We determined the total number of high-quality ideas by defining a high-quality idea as having a rating of 3.5 or above on the combined five-point scale and totaling the number of ideas that met this standard. We chose the standard of 3.5 because it was slightly above the mean rating of a sample of 100 ideas randomly chosen from all the nonredundant ideas generated across treatments.

The data from the two postsession questionnaires were used in the subsidiary analyses to better understand the effects of production blocking and evaluation apprehension and to examine differences in the perceptions of the two technologies and of the three group sizes.

Results

A two-factor (technology by group size) analysis of variance (ANOVA) was conducted on responses to each question from the presession questionnaire to determine whether there had been any significant differences between the groups before the session began. No presession differences emerged.

All variables were analyzed in a mixed ANOVA. Group size was a three-level between-group factor, and technology was a two-level within-group factor. A preliminary analysis of the number of ideas generated for the two problems showed no significant difference ($F_{1,48} = 2.32$, n.s.). Similarly, when we assessed the impact of the order in which the technologies were presented on the number of ideas generated for the two problems, we again

found no significant difference in the number of ideas generated ($F_{1,48}$ = .39, n.s.). Accordingly, we did not include task or order in the subsequent analysis.

An ANOVA for the number of nonredundant ideas showed that all three effects were statistically significant. Table 1 shows the mean number of ideas generated in the six cells, and Table 2 reports the F-values. As predicted, electronic groups outperformed nonelectronic groups ($F_{1,48}$ = 13.77, p < .01), thus replicating the findings of Gallupe and colleagues (1991). We found that the larger groups—4 and 6 people—produced more ideas than the smaller groups ($F_{2,48}$ = 18.89, p < .01). An interaction effect qualifies both findings. When the larger groups used the electronic technology, the increase in productivity was more pronounced than it was when the larger groups used the nonelectronic technology, producing a significant interaction effect for technology by group size ($F_{2,48}$ = 7.81, p < .01).

Post hoc Tukey tests (α = .05) showed that 4- and 6-member electronic brainstorming groups generated more ideas than equivalently sized nonelectronic brainstorming groups but showed no difference for 2-member groups. Although the larger nonelectronic brainstorming groups appeared to generate more ideas than the smaller nonelectronic groups ($\bar{x}$'s = 26.20, 31.80, and 35.90), post hoc Tukey tests showed no significant differences between the three group sizes. Tukey tests did, however, reveal that 4- and 6-member electronic brainstorming groups generated more ideas ($\bar{x}$ = 42.20 and 69.80) than 2-member electronic brainstorming groups ($\bar{x}$ = 24.80).

For the quality of ideas, the same pattern emerged (see Tables 1 and 2), in part because the number of unique ideas generated affected the two quality measures. We found that the electronic groups had a higher overall quality score and generated more high-quality ideas than the nonelectronic groups ($F_{2,48}$ = 29.35, p < .01, and $F_{2,48}$ = 20.28, p < .01). The larger groups had higher overall quality scores and more high-quality ideas than the smaller groups ($F_{2,48}$ = 33.67, p < .01, and $F_{2,48}$ = 27.84, p < .01). These main effects are again qualified by a significant interaction effect for both the quality score and number of high-quality ideas ($F_{2,48}$ = 9.32, p < .01, and $F_{2,48}$ = 6.80, p < .01). Post hoc Tukey tests (α = .05) indicated that the larger electronic groups had higher quality scores and more high-quality ideas than larger nonelectronic groups, but this pattern was not true for the 2-member groups. Therefore, results only partially supported Hypothesis 1 because 2-member electronic groups did not outperform 2-member nonelectronic groups. Hypothesis 2 was fully supported since the productivity of electronic brainstorming groups increased with group size, but that of nonelectronic brainstorming groups did not.

Tables 1 and 2 also present the means, standard deviations, and results of statistical tests of subjects' perceptions of production blocking, evaluation apprehension, and satisfaction with the process. All items in the three scales were assessed on seven-point, verbally anchored formats (1 = strongly agree, 7 = strongly disagree). We measured production blocking using three items: whether subjects expressed ideas immediately after they

TABLE 1
Means and Standard Deviations, Experiment 1

| | Group Size | | | | | |
| | 2 | | 4 | | 6 | |
Dependent Variables	Electronic Brainstorming	Nonelectronic Brainstorming	Electronic Brainstorming	Nonelectronic Brainstorming	Electronic Brainstorming	Nonelectronic Brainstorming
Number of nonredundant ideas[a]						
Means	24.80	26.20	42.20	31.80	69.80	35.90
s.d.	8.22	9.68	11.77	11.87	19.10	10.11
Overall quality score[a]						
Means	70.95	67.65	125.30	81.35	205.90	109.20
s.d.	18.84	33.14	35.15	26.52	51.58	31.74
Number of high-quality ideas[a]						
Means	10.00	10.10	17.30	11.10	28.10	16.10
s.d.	3.33	5.68	3.71	3.66	7.84	5.42
Production blocking[b,c]						
Means	2.13	2.03	2.23	2.74	2.31	3.27
s.d.	0.95	1.24	1.03	1.19	1.05	1.34
Evaluation apprehension[b,c]						
Means	2.42	2.32	2.25	2.87	2.04	3.24
s.d.	1.21	1.00	0.90	1.10	0.87	1.54
Satisfaction[b,c]						
Means	5.05	5.72	5.36	5.22	5.38	4.81
s.d.	1.29	0.83	1.30	0.88	1.15	1.35

[a] Data are for 30 groups, two observations per group.
[b] Data are for 120 subjects, two observations per individual.
[c] The higher the value, the stronger the perception or attitude.

TABLE 2
Results of ANOVA, Experiment 1

Dependent Variables	Technology	Group Size	Technology by Group Size	Mean Square Error
Number of nonredundant ideas	13.77**	18.89**	7.81**	91.08
Overall quality score	29.35**	33.67**	9.32**	1,176.52
Number of high-quality ideas	20.28**	27.84**	6.80**	26.92
Production blocking	7.91**	6.41**	3.01*	1.25
Evaluation apprehension	27.33**	0.82	5.06**	1.33
Satisfaction	0.85	1.26	4.58**	1.40

* $p < .05$
** $p < .01$

thought of them, whether they expressed all ideas that occurred to them, and whether they had to wait to express ideas. We report the average for the three items (Cronbach's α = .78). Significant main effects emerged for both technology and group size ($F_{1,235}$ = 7.91, $p < .01$, and $F_{1,235}$ = 6.41, $p < .01$). As expected, electronic group members perceived less production blocking than nonelectronic group members. Individuals in larger groups felt there was more production blocking than did individuals in smaller groups. A significant interaction effect qualifies these results ($F_{1,235}$ = 3.01, $p < .05$). The members of the three sizes of electronic brainstorming group reported little difference in perceived production blocking. In contrast, nonelectronic brainstorming groups reported increasing production blocking as group size increased.

Subjects' perceptions of evaluation apprehension were measured by three items: whether they felt at ease, whether they were apprehensive, and whether they felt comfortable. We report the average for the three items (Cronbach's α = .83). A significant main effect emerged for technology ($F_{1,235}$ = 27.33, $p < .01$). As expected, members of electronic groups felt less apprehensive than nonelectronic groups. A significant technology-by-group-size interaction qualifies this finding ($F_{1,235}$ = 5.06, $p < .01$). Post hoc Tukey tests (α = .05) found that members of electronic brainstorming groups of the three sizes had similar perceptions, although members of 2-person groups may have been slightly more apprehensive. The perceptions of evaluation apprehension in the 2-member nonelectronic brainstorming groups closely matched those in the 2-member electronic brainstorming groups, but the evaluation apprehension of nonelectronic groups increased with group size, so that 6-member nonelectronic brainstorming groups reported more evaluation apprehension than 6-member electronic brainstorming groups.

The perception of satisfaction was measured by two items: Were you satisfied with the process used? Would you advocate this process to generate ideas? We report the average for the two items (Cronbach's α = .79).

We found a significant interaction effect ($F_{1,235} = 4.58$, $p < .01$). Post hoc Tukey tests ($\alpha = .05$) indicated that again, perceptions were similar across the three group sizes for the electronic brainstorming groups, although individuals in the 2-member groups may have been slightly less satisfied. Perceptions of satisfaction in the 2-member nonelectronic brainstorming groups matched those in the 2-member electronic brainstorming groups, but satisfaction decreased as groups became larger; the 6-member nonelectronic brainstorming groups reported less satisfaction than did the 6-member electronic brainstorming groups.

EXPERIMENT 2

Methods

The purpose of experiment 2 was to provide an additional test of the hypotheses in a different environment using a different subject pool and a different manipulation of group size. The groups studied had 6 and 12 members. We chose the smaller size to match the largest size in experiment 1 and chose the larger size because Osborn (1954) advocated verbal brainstorming groups of up to 12 members, and groups of this size have used electronic brainstorming in field studies (cf. Nunamaker, Applegate, & Konsynski, 1988).

Subjects. One hundred forty-four undergraduate students (92 men and 52 women) enrolled in a production-operations management course at the University of Arizona participated for partial course credit. Their mean age was 23.5 years. There were eight groups of each of the two sizes. Twenty-eight percent of the subjects had prior experience using electronic brainstorming. We randomly assigned all subjects to groups and randomly assigned groups to treatments.

Task. The questions were the same as in experiment 1 but were modified to fit local conditions. Subjects generated ideas on "How can tourism be improved in Tucson?" and "How can campus security be improved at the University of Arizona?" In addition, the same two practice questions were used.

Treatments and procedures. Groups had either 6 or 12 members. All groups brainstormed using the same technologies used in experiment 1 under the same, fully balanced, repeated measures design used in experiment 1. Procedures were also the same for the two experiments.

Dependent variables. The dependent variables were the same as those in experiment 1, and the same experienced, treatment- and hypotheses-blind coders who coded the ideas for experiment 1 coded the data for the second experiment.

Results

All variables were analyzed using the same procedures as were used in experiment 1. Group size was a two-level between-groups factor, and tech-

nology was a two-level within-group factor. A preliminary analysis of the number of ideas generated for the two problems indicated no significant main effects for the problems or their sequence. As in experiment 1, a two-factor (technology by group size) ANOVA was conducted on each question of the presession questionnaire to determine whether there had been any significant differences between the groups before the session began. No presession differences emerged.

An ANOVA of the number of nonredundant ideas generated again showed all three effects were statistically significant (see Tables 3 and 4). Electronic groups again outperformed nonelectronic groups ($F_{1,28} = 42.02$, $p < .01$), thus replicating the results from experiment 1, although this finding is again qualified by the technology-by-group-size interaction effect ($F_{1,28} = 22.27$, $p < .01$). The larger groups again produced more ideas than the smaller groups ($F_{1,28} = 20.88$, $p < .01$). This pattern was particularly true for

TABLE 3
Means and Standard Deviations, Experiment 2

Dependent Variables	Group Size			
	6		12	
	Electronic Brainstorming	Nonelectronic Brainstorming	Electronic Brainstorming	Nonelectronic Brainstorming
Number of nonredundant ideas[a]				
Means	39.10	30.20	85.90	29.50
s.d.	10.32	12.04	23.43	3.62
Overall quality score[a]				
Means	146.00	99.10	340.00	111.00
s.d.	36.20	38.70	102.00	28.70
Number of high-quality ideas[a]				
Means	25.00	17.12	64.62	20.00
s.d.	7.56	7.81	14.94	4.60
Production blocking[b,c]				
Means	2.69	3.11	2.34	3.66
s.d.	1.26	1.26	1.20	1.37
Evaluation apprehension[b,c]				
Means	2.33	3.13	2.01	3.78
s.d.	0.95	1.23	0.96	1.38
Satisfaction[b,c]				
Means	5.07	4.73	5.64	4.35
s.d.	1.41	1.30	1.12	1.26

[a] Data are for 16 groups, two observations per group.

[b] Data are for 144 subjects, two observations per individual.

[c] The higher the value, the stronger the perception or attitude.

TABLE 4
Results of ANOVA, Experiment 2

Dependent Variables	Technology	Group Size	Technology by Group Size	Mean Square Error
Number of nonredundant ideas	42.02**	20.88**	22.27**	202.62
Overall quality score	43.58**	24.52**	19.19**	3,488.21
Number of high-quality ideas	70.42**	32.72**	23.68**	90.60
Production blocking	29.42**	0.35	8.11**	3.18
Evaluation apprehension	78.18**	1.29	10.92**	1.96
Satisfaction	27.10**	0.37	9.01**	1.59

* $p < .05$
** $p < .01$

the electronic groups, as indicated by the significant interaction effect: 12-person electronic brainstorming groups generated more ideas than 6-person electronic brainstorming groups, but there was no difference between 6- and 12-member nonelectronic brainstorming groups.

The same procedures used in experiment 1 were used to assess idea quality. The pattern for the overall quality score and the number of high-quality ideas was the same as in experiment 1. All three effects were statistically significant for both measures. The electronic groups generated more high-quality ideas than the nonelectronic groups ($F_{1,28} = 70.42$, $p < .01$), and the larger groups produced more high-quality ideas than the smaller groups ($F_{1,28} = 32.72$, $p < .01$). As in our analysis of the number of nonredundant ideas generated, follow-up Tukey tests for idea quality indicated that the interaction effect ($F_{1,28} = 23.68$, $p < .01$) was due to the 12-person electronic brainstorming groups generating more high-quality ideas than the 6-person electronic brainstorming groups, but no difference emerged for large and small nonelectronic brainstorming groups. Thus, findings supported both Hypotheses 1 and 2.

Tables 3 and 4 present means, standard deviations, and results of statistical tests of subjects' perceptions. The alphas for the three perceptual measures were similar to the values in experiment 1 (.73 for production blocking, .84 for evaluation apprehension, and .78 for satisfaction). All three perceptual measures produced technology and technology-by-group-size effects. As in experiment 1, members of electronic brainstorming groups perceived less production blocking than members of nonelectronic groups ($F_{1,285} = 29.42$, $p < .01$). Post hoc Tukey tests indicated that the interaction effect was the result of the members of both sizes of electronic group reporting little difference in production blocking. In contrast, the 12-person nonelectronic brainstorming groups reported more production blocking than the 6-member groups ($F_{1,285} = 8.11$, $p < .01$).

For evaluation apprehension, members of both sizes of electronic brainstorming group had similar perceptions. In contrast, perceptions of evalua-

tion apprehension in the nonelectronic brainstorming groups increased with group size: members of the 12-person nonelectronic brainstorming groups reported more evaluation apprehension than members of the 12-person electronic brainstorming groups. As a result, we found significant interaction and technology effects ($F_{1,285} = 10.92$, $p < .01$, and $F_{1,285} = 78.18$, $p < .01$).

The perceptions of satisfaction were again similar to those in experiment 1, but they were more pronounced. The members of the electronic groups were more satisfied than those of the nonelectronic groups ($F_{1,285} = 27.10$, $p < .01$), indicating a main effect for technology. A technology-by-group-size interaction qualified the main effect ($F_{1,285} = 9.01$, $p < .01$). Perceptions of satisfaction increased with group size for electronic groups but decreased with group size for nonelectronic groups.

DISCUSSION

The results of the two experiments are highly consistent and can be quickly summarized. Technology did not affect productivity when there were 2 people in a group but did have a significant effect on productivity when there were 4, 6, or 12 people. Our 4-person groups replicated the earlier finding that the productivity of electronic brainstorming groups is higher than that of nonelectronic brainstorming groups (Gallupe et al., 1991). The growing superiority of the electronic brainstorming groups of 6 and 12 members extended those results. In the electronic groups, performance increased substantially with group size. In contrast, performance in the nonelectronic brainstorming groups did not increase as group size increased.

The results demonstrate both the limits and strengths of electronic brainstorming. Technology did not make a difference when there was no anonymity and only limited production blocking (the 2-person groups). Thus, the benefits of electronic brainstorming appear limited at the lowest bound of group size. The advantages of electronic brainstorming became pronounced as anonymity increased in electronic brainstorming groups and production blocking increased in nonelectronic brainstorming groups. Examining the per person productivity in the variously sized groups across the two technologies sharply illustrates that pattern. In experiment 1, per person output in the nonelectronic brainstorming groups fell steadily as group size increased ($\bar{x}$'s $= 13.10$, 7.95, and 5.98, respectively). But for the electronic groups means were 12.40, 10.55, and 11.64. Thus, per person productivity fell as nonelectronic brainstorming groups became larger but remained steady for electronic brainstorming groups; this produced a significant technology-by-group-size interaction on average number of ideas per person ($F_{2,27} = 11.54$, $p < .01$).

In experiment 2, the average per person output of ideas in the nonelectronic brainstorming groups again fell with group size; there were 5.0 ideas and 2.5 ideas per person respectively in the 6- and 12-person groups. In contrast, no change occurred in the electronic brainstorming groups (6.0 and

7.2 ideas).[2] Increasing group size appeared to hamper idea generation in the traditional brainstorming groups but did not do so in the electronic brainstorming groups; the technology-by-group-size effect for average number of ideas per person was significant ($F_{1,14} = 12.98$, $p < .01$).

We attribute these results to differences in production blocking and evaluation apprehension. Production blocking should increase as group size increases in nonelectronic brainstorming groups because many group members are attempting to state their ideas but cannot because someone else is speaking. In contrast, all members of electronic brainstorming groups can work simultaneously. Thus, production blocking should not differ with the size of electronic groups. The postsession measure of production blocking supported this explanation. In both studies, we found that electronic brainstorming groups reported less production blocking than nonelectronic brainstorming groups and that production blocking was most pronounced for the larger nonelectronic brainstorming groups. We conclude that one reason for the differences in the number of ideas generated across technology and group size is that production blocking remained at a relatively constant, low level in the electronic brainstorming groups but increased for nonelectronic brainstorming groups as they became larger.

Results are also attributable to differences in evaluation apprehension between the two technologies. Evaluation apprehension in nonelectronic brainstorming groups may increase as group size increases because there are more people available to be critical of an idea. In contrast, except in 2-member groups, ideas entered by members of electronic brainstorming groups are anonymous, and evaluation apprehension should not increase with group size. Our postsession data supported this interpretation in both experiments. Members of the electronic brainstorming groups reported less apprehension than did members of the nonelectronic brainstorming groups. Perceptions of evaluation apprehension remained constant across group size for members of electronic brainstorming groups but increased with group size for nonelectronic brainstorming groups. This pattern is consistent with the view that apprehension will increase with the number of potentially critical members in verbal groups. We conclude that the technology's effect on production blocking and evaluation apprehension is the most likely explanation for the observed effects on the productivity of larger and smaller electronic brainstorming and nonelectronic brainstorming groups.

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[2] The difference in the number of unique ideas produced was an unanticipated difference between the two experiments. Although the same coders assessed the ideas from both experiments, the 6-person groups at Queen's produced many more ideas than the Arizona groups. One explanation is that the demographic compositions of the groups were somewhat different. The average age of the Queen's groups' members was lower, and the groups contained higher percentages of women and individuals who had no experience with the electronic brainstorming technique. Another explanation is that the tasks were more relevant and motivating for one group than for the other. For example, promoting tourism in Kingston, Ontario, may be more of a concern than it is in Tucson, Arizona.

In addition, the members of the electronic brainstorming groups were more satisfied than the members of the nonelectronic brainstorming groups. Further, although satisfaction increased with group size for electronic groups, it decreased for the nonelectronic groups. Thus, the technology not only eliminated the per person productivity decline that is normally found as groups grow in size, but also increased the satisfaction of group members.

One other possible explanation should be noted: novelty. If subjects found the electronic brainstorming technology more engaging because it was novel, they may have worked harder and produced more ideas. The design of the experiments does not provide a strong test of this account. It does, however, provide a weak test. In experiment 1, none of the subjects had previous experience with electronic brainstorming, whereas 28 percent of the subjects in experiment 2 had prior experience. That level of diminished novelty in experiment 2 was not sufficient to eliminate the effects of the technology. In addition, novelty cannot easily account for the significant interaction of technology and group size found in both experiments. If novelty were a factor, differences between experienced and inexperienced subjects might show up in the postsession data, but an analysis of those data comparing experienced and inexperienced subjects showed no differences for production blocking, evaluation apprehension, and satisfaction.

Finally, our results for the quality of ideas are similar to those for the number of unique ideas generated. The groups that generated more unique ideas (the larger electronic brainstorming groups) also generated more high-quality ideas. It is reassuring to note that quality did not suffer when quantity increased.

IMPLICATIONS

The main finding of this study was that the productivity of electronic brainstorming groups increased with size, but the productivity of traditional brainstorming groups did not so increase. These results have several implications for researchers and practitioners.

Implications for Research

The benefits of parallel entry and anonymity that electronic brainstorming provides likely contributed to the improved performance and satisfaction of the electronic brainstorming groups. It is unclear which of these benefits is the more important in improving performance and satisfaction. An immediate task for researchers is to tease out the comparative effects of production blocking and anonymity, while keeping in mind the difficulties of conducting fair comparisons (Cooper & Richardson, 1986).

A second implication for researchers is that the benefits of electronic brainstorming need to be assessed over a wider range of group sizes. It seems unlikely that the increase in the per person productivity in electronic brainstorming groups will remain constant over an infinite increase in size, in part because people would run out of ideas, and in part because the temptation

to free ride would increase as group size increased (Albanese & Van Fleet, 1985). Thus, a second task for research is to extend the size of electronic brainstorming groups and assess the extension's impact on productivity.

A third implication is that electronic brainstorming needs to be studied in conjunction with other group tasks. Idea generation is only one type of task groups in organizations perform. We found that electronic technology can enhance idea generation by groups of varying size. One important question is whether the new electronic tools can aid in the performance of other group tasks. Brainstorming has pooled interdependence (Thompson, 1967): members do not depend on other members to perform tasks before they can perform theirs. Electronic groups may not perform as well on tasks that have sequential interdependence because keyboarding is slower than talking and lacks some of the richness of speech (Daft & Lengel, 1984). Electronic brainstorming may turn out to be ideal for generating ideas because of the pooled interdependence involved but may not be so helpful when sequential, subtle communication is required.

Implications for Practice

For practitioners, an implication of these results is that increasing group size, at least in the range we assessed, should not be considered a constraint on the effectiveness of idea generation groups. Electronic technology can support the brainstorming activities of groups of 12 members and possibly more. Our data indicate that even in 12-member groups, individuals feel satisfied with the electronic brainstorming process and feel they can get their ideas expressed. At the minimal size of 2, the choice of technology depends on grounds other than productivity.

Another implication for practitioners is that the anonymity electronic brainstorming provides may reduce the inhibitory effects of status differences. Status differences are likely to reduce the willingness of organization members to express their views, particularly if those views raise questions of loyalty and team play (cf. Jackall, 1988). With electronic brainstorming, lower-status members of a management group may be willing to air their ideas without feeling as apprehensive as they would in verbal brainstorming about whether higher-status members will react negatively to those ideas. The anonymity electronic brainstorming provides may also make it easier for group members to play devil's advocate. Electronic brainstorming will not eliminate all the risk of stating ideas, but it may reduce it, particularly in larger, hierarchical groups.

Electronic brainstorming also enables group members in dispersed locations to generate ideas interactively. In this mode, electronic brainstorming is a sophisticated form of computer conferencing wherein group members' ideas are automatically sent to each other's screens during the idea generation session. This process may be particularly helpful when people's schedules differ markedly because of time zones and work loads. It may offer an attractive alternative to conference calls that require everyone to be available to interact at the same time.

Finally, the simultaneity of input in electronic brainstorming also prevents one individual from dominating the idea generation process. Inputs tend to be evenly distributed over group members, which helps increase not only the number of ideas generated but also people's satisfaction with the process.

This study raises additional questions about the adoption and use of this technology by organizational groups. For example, how can groups using electronic brainstorming integrate their results into subsequent activities, such as idea organization, multicriteria decision making, and stakeholder benefits' analysis, that may or may not be supported by other electronic technologies? Will group performance and satisfaction with electronic brainstorming technologies change over time, as groups and organizations gain experience with them? Can the presence of this technology influence the composition of groups using it in such a way that large groups encompassing a wide range of organizational stakeholders can resolve key issues? Further research using both experimental laboratory studies and field studies is needed to determine the effects of the use of new electronic group technologies.

REFERENCES

Albanese, R., & Van Fleet, D. D. 1985. Rational behavior in groups: The free riding tendency. *Academy of Management Review*, 10: 244–255.

Bouchard, T. J., Drauden, G., & Barsaloux, J. 1974a. Brainstorming procedure, group size and sex as determinants of the problem solving effectiveness of groups and individuals. *Journal of Applied Psychology*, 59: 135–138.

Bouchard, T. J., Drauden, G., & Barasaloux, J. 1974b. A comparison of individual, subgroup and total group methods of problem solving. *Journal of Applied Psychology*, 59: 51–55.

Bouchard, T. J., & Hare, M. 1970. Size, performance, and potential in brainstorming groups. *Journal of Applied Psychology*, 54: 51–55.

Connolly, T., Jessup, L. M., & Valacich, J. S. 1990. Idea generation and GDSS: Effects of anonymity and evaluative tone. *Management Science*, 36: 689–703.

Cooper, W. H., Bastianutti, L., Young, V., Gallupe, R. B., & McCallum, L. 1991. *A manual for coding brainstorming ideas.* Unpublished manuscript, School of Business, Queen's University, Kingston, Ontario, Canada.

Cooper, W. H., & Richardson, A. J. 1986. Unfair comparisons. *Journal of Applied Psychology*, 71: 179–184.

Daft, R. L., & Lengel, R. H. 1984. Information richness: A new approach to managerial behavior and organization design. In B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior,* vol. 6: 191–233. Greenwich, CT: JAI.

Delbeq, A., Van de Ven, A., & Gustafson, D. 1975. *Group techniques: A guide to nominal and delphi processes,* Glenview, IL: Scott, Foresman.

Dennis, A. R., Nunamaker, J. F., Jr., & Vogel, D. R. 1991. A comparison of laboratory and field research in the study of electronic meeting systems. *Journal of Management Information Systems,* 7(3): 107–135.

Dennis, A. R., Valacich, J. S., & Nunamaker, J. F., Jr. 1990. An experimental investigation of

small, medium and large groups in an electronic meeting system environment. *IEEE Transactions on Systems, Man and Cybernetics,* 25: 1049–1057.

Diehl, M., & Stroebe, W. 1987. Productivity loss in brainstorming groups: Toward the solution of a riddle. *Journal of Personality and Social Psychology,* 53: 497–509.

Diehl, M., & Stroebe, W. 1991. Productivity loss in idea-generation groups: Tracking down the blocking effect. *Journal of Personality and Social Psychology,* 61: 392–403.

Fern, E. F. 1982. The use of focus groups for idea generation: The effects of group size, acquaintanceship, and moderator on response quantity and quality. *Journal of Marketing Research,* 19: 1–13.

Gallupe, R. B., Bastianutti, L., & Cooper, W. H. 1991. Unblocking brainstorms. *Journal of Applied Psychology,* 76: 137–142.

Hackman, J. R., & Vidmar, N. 1970. Effects of size and task type on group performance and member reactions. *Sociometry,* 33: 37–54.

Hegedus, D. M., & Rasmussen, R. V. 1986. Task effectiveness and interaction process of a modified nominal group technique in solving an evaluation problem. *Journal of Management,* 12: 545–560.

Jablin, F. M., & Seibold, D. R. 1978. Implications for problem solving groups of empirical research on brainstorming: A critical review of the literature. *Southern States Speech Communication Journal,* 43: 327–356.

Jackall, R. 1988. *Moral mazes: The world of corporate managers.* New York: Oxford.

Lamm, H., & Trommsdorff, G. 1973. Group versus individual performance on tasks requiring ideational proficiency (brainstorming): A review. *European Journal of Social Psychology,* 3: 361–387.

Latané, B., Williams, K., & Harkins, S. 1979. Many hands make light the work: The causes and consequences of social loafing. *Journal of Personality and Social Psychology,* 37: 822–832.

Lewis, A. C., Sadosky, T. L., & Connolly, T. 1975. The effectiveness of group brainstorming in engineering problem solving. *IEEE Transactions on Engineering Management,* 22(3): 119–124.

Nunamaker, J. F., Applegate, L. M., & Konsynski, B. R. 1988. Computer-aided deliberation: Model management and group decision support. *Journal of Operations Research,* 36: 826–848.

Nunamaker, J. F., Dennis, A. R., Valacich, J. S., Vogel, D. R., & George, J. F. 1991. Electronic meeting systems to support group work. *Communications of the ACM,* 34(7): 40–61.

Osborn, A. F. 1954. *Applied imagination.* New York: Scribner.

Renzulli, J. S., Owen, S. V., & Callahan, C. M. 1974. Fluency, flexibility and originality as a function of group size. *Journal of Creative Behavior,* 8, 107–113.

Steiner, I. D. 1972. *Group process and productivity.* New York: Academic Press.

Taylor, D. W., Berry, P. C., & Block, C. H. 1958. Does group participation when using brainstorming facilitate or inhibit creative thinking? *Administrative Science Quarterly,* 3: 23–47.

Thompson, J. C. 1967. *Organizations in action.* New York: McGraw-Hill.

Van Gundy, A. B. 1981. *Techniques of structured problem solving.* New York: Van Nostrand Reinhold.

Van Gundy, A. B. 1987. *Creative problem solving—A guide for trainers and management.* New York: Quorum Books.

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EFFECT OF RELATIVE DECISION MONITORING ON CHIEF EXECUTIVE COMPENSATION

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This study investigated the effects of relative decision monitoring, whereby decisions are compared to those of competitors, on chief executive officer (CEO) compensation. We tested for both cash compensation (salary plus bonus) and cash-plus-stock-option compensation. The study's premise was that, to the extent boards of directors consider behavioral information in the CEO evaluation process, performance should have a stronger influence on pay when CEO decisions differ from typical industry decisions. Thus, we compared critical strategic decisions of CEOs with the decisions of same-industry competitors. Results indicate that unique decision making significantly moderates the relationship between performance and compensation under some, but not all, conditions.

The separation of ownership and control that characterizes modern corporate structure represents an efficient solution for the problem of allocating the risks of production (Alchian & Demsetz, 1972; Berle & Means, 1968; Williamson, 1984). But separation also creates problems that derive from the fundamental conflict of interest between principal and agent (Jensen & Meckling, 1976). According to agency theorists, it is primarily compensation contracts, as administered by boards of directors, that resolve this conflict and achieve integration of principal and agent interests (Eisenhardt, 1985; Fama, 1980; Oviatt, 1988).

In practice, however, the administration of compensation contracts—the structuring of incentives and the monitoring and evaluation of management's performance—is complicated by delegation of decision making and the information asymmetries that result. As Walsh and Seward (1990) noted, boards face the complex and difficult task of attributing responsibility for organizational results to management or to environmental factors beyond management's control. To fulfill its governance function, therefore, a board must devise an evaluation process that protects shareholder interests with-

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out shifting undue performance risk to management (Baysinger & Hoskisson, 1990; Eisenhardt, 1989).

The purpose of this study was to test the extent to which boards use relative decision monitoring to evaluate and compensate corporate chief executives. Relative evaluation of financial outcomes reduces the systematic risk managers face by comparing their financial results with those of a reference group. Similarly, relative decision monitoring incorporates behavioral data into the evaluation process by comparing managers' decisions with those of a reference group. In theory, this incremental information should improve the efficiency of compensation schemes (Holmstrom, 1979, 1982). To our knowledge, however, there has been no empirical test of the extent to which boards use relative decision monitoring in executive compensation decisions.

LITERATURE OVERVIEW

Much of the research on executive compensation has focused on the relationship between chief executive officer (CEO) pay and absolute measures of firm performance (Ciscel & Carroll, 1980; Lewellen & Huntsman, 1970; McGuire, Chiu, & Elbing, 1962; Masson, 1971; Murphy, 1985). The underlying premise has generally been that tying executive pay to firm performance helps to align the interests of executives with the interests of shareholders. The central research question in these studies has been whether or not compensation contracts provide management with an incentive to maximize shareholder wealth.

Empirical tests in this area have yielded equivocal results. Although some studies have reported a positive association between firm performance and compensation (Coughlin & Schmidt, 1985; Murphy, 1985), others have found little or no relationship (Benston, 1985; Kerr & Bettis, 1987). Observers have noted that even when positive, the associations obtained have tended to be modest and have explained little of the variance in executive compensation (Jensen & Murphy, 1990; Lambert & Larcker, 1985; Tosi & Gomez-Mejia, 1989).

Recently, there has been increasing interest in the idea that relative performance—performance measured against the performance of competitors—may be more strongly related to executive compensation than is absolute performance. Application of relative performance evaluation to executive compensation rests on the idea that the efficiency of an agency contract can be improved by the incorporation of information about the performance of other agents facing similar business risk (Antle & Smith, 1986). When an agent's efforts are not observable, a principal obtains protection from "moral hazard" (potential loss of output) by offering a contract in which compensation is a function of realized output. Doing so lessens the efficiency of the contract, however, by transferring risk to the agent. High risk may motivate the agent to pursue overly cautious decisions or require the principal to pay a risk premium. Holmstrom (1979) showed that incremental information

about an agent's unobservable effort improves contract efficiency either by reducing the agent's risk but not incentives or by increasing incentives but not risk. Information about the performance of other agents is especially valuable because it reveals the effect of systematic risk (the risk common to all managers in a reference group) on an agent's performance (Holmstrom, 1982). If evaluators control for systematic risk, they can more accurately attribute responsibility for performance outcomes either to an agent's effort or to external events affecting all agents.

Empirical tests for the presence of relative performance evaluation in executive compensation have been limited but have produced some supporting evidence. In their study of 39 firms, Antle and Smith (1986) found weak evidence consistent with the theory of relative performance evaluation in 16 firms but none in the remaining 23. Results were more robust for accounting-based performance measures than for market-based performance measures. Gibbons and Murphy (1990) studied a sample of more than 1,000 firms over a 13-year period and found evidence that boards of directors incorporated both industry and market performance in their determination of CEO compensation. Market-relative performance had a greater influence on compensation than industry-relative performance when the two measures were tested together. This finding was robust across one-, two-, three-, and four-digit Standard Industrial Classification (SIC) industry definitions. Gibbons and Murphy concluded that strong evidence existed for the use of relative performance evaluation in CEO compensation. In an attempt to replicate Antle and Smith (1986), they also found that differences in results were attributable to differences in sample size, sample composition, and methodology.

Morck, Shleifer, and Vishny (1989) examined the influence of relative performance evaluation on executive turnover and found replacement of top management teams to be more likely in firms that underperformed relative to their industries. This was true in high-performing as well as low-performing industries. Their data further suggested that boards faced with poor performance relative to a firm's industry encouraged friendly acquisitions. Consistent with relative performance evaluation theory, these authors concluded that boards evaluated CEOs by comparing them to CEOs in the same industry and replaced CEOs when underperformance was attributed to management actions.

Relative Evaluation of CEO Decision Making

The value of relative performance evaluation lies in its ability to increase information about an agent's behavior by incorporating information about the behavior of other agents facing similar risk. According to Holmstrom's analyses (1979, 1982), any monitoring that incorporates information about the behaviors of comparable agents should result in improvements in contract efficiency.

One possible form of such monitoring is comparison of an agent's op-

erating decisions to the decisions of competing agents. Whereas relative performance evaluation depends on the monitoring of financial outcomes, the monitoring of operating decisions provides explicit behavioral information, thereby reducing both the principal's reliance on outcome-based control and the agent's risk and increasing contract efficiency (Baysinger & Hoskisson, 1990; Fama & Jensen, 1983; Holmstrom, 1979). The monitoring of relative decision making provides an industry-specific, behavioral baseline against which agent actions can be evaluated. Like the monitoring of relative performance, it separates the portion of a decision that is unique to a given agent from the portion that is common to all agents competing in the same industry.

In the absence of a behavioral criterion, agent performance can only be inferred from absolute or relative outcomes. Such inference provides only a partial basis for attributing results to management. By monitoring relative decision making as well as relative outcomes, a principal gains an assessment of the uniqueness of an agent's actions and thus has a more complete basis for evaluating performance and attributing outcomes.

Research Objective

Our purpose in this research was to test for evidence of the use of relative evaluation of operating decisions in the determination of the compensation of chief executives. If decision monitoring plays a role, we expected it to operate in accordance with the logic described above. Where decision monitoring reveals evidence of unique decisions—decisions different from those of other CEOs in the same industry—there is a basis for attributing financial results to management and a rationale for closely tying pay to results. Where there is no evidence of unique decision making, there is no basis for attributing outcomes to management and no reason to expect a close relationship between results and pay. Implicit in this logic is the assumption that, in the corporate governance process, changes in pay are a response to management performance; that is, performance and evaluation precede changes in compensation. Thus, we viewed unique decision making as moderating the relationship between performance and pay. Figure 1 summarizes these relationships.

FIGURE 1
Model of Hypothesized Relationship

Company Performance --► CEO Compensation

Evidence of Unique
Decision Making
by CEO
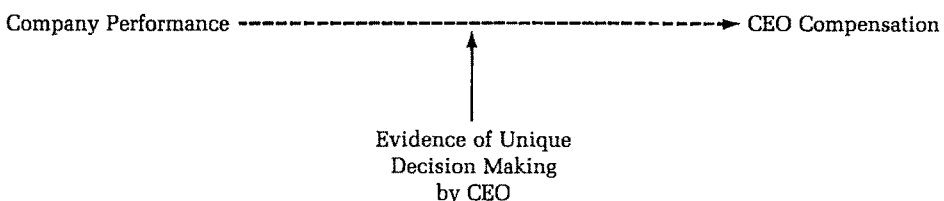
The following hypothesis was examined:

> Hypothesis 1: When unique decisions are present, perfor-
> mance and pay will be more closely associated than they
> will be when unique decisions are absent.

METHODS

Testing Issues

The hypothesis advanced above suggests that measures of CEO decision making should have a number of operational properties. First, decision variables used to represent decision making should be primarily controlled by top management. To the extent that such variables are determined by a firm's CEO rather than by subordinates or external forces, they clearly convey information about CEO behavior and provide a strong basis for attributing responsibility for corporate performance to the CEO.

Second, to convey information about a CEO's responsibility for results, decision variables should be important to the competitive positions of firms in the relevant industry. The variables' importance ensures that decisions concerning them will be viewed by evaluators as capable of influencing financial outcomes. It should be noted that the variables critical to competitive position vary across industries (Porter, 1980, 1985). Thus, indicators of decision making are likely to be industry-specific.

Third, in order to convey information and to influence perceptions of CEO performance, decision variables must be observable to evaluators. However, observability does not necessarily imply that a judgment can be made regarding decision quality. On the contrary, given information asymmetry, it is unlikely that evaluators will have the information needed to evaluate decision quality precisely (Walsh & Seward, 1990). In the case of research and development expenditures, for example, evaluators of a CEO's performance are unlikely to have sufficient information about many influences on such decisions, such as the opportunities available to the firm and the actions of competitors. Thus, the evaluators would be unable to precisely assess whether an appropriate decision was made. Even after results are observed, in fact, it may not be possible to evaluate whether expenditures were too high, representing wasted firm resources, or too low, representing missed opportunities. Nonetheless, evaluators can assess whether a CEO's decision differed from some broad reference point like levels of expenditures in the industry. This assessment provides incremental information— information beyond that provided by observing outcomes only—that can improve the evaluation of the CEO (Holmstrom, 1979).

Selection of Variables, Industries, and Time Periods

To test for the moderating role of decision making, it was first necessary to identify critical decision variables that met the operational conditions described above, variables representing decisions (1) likely to be controlled

at the highest management levels, (2) critical to competitive position
throughout an industry, and (3) easily observed by evaluators. According to
Porter (1985, 1990) and others (e.g., Baysinger & Hoskisson, 1989), astute
management of research and development expenditures is critical to com-
petitive position in several high-technology industries. R&D decisions,
therefore, are likely to be made at the highest managerial levels and should
be observable, and of interest, to evaluators. Similarly, advertising expendi-
tures reportedly represent a critical aspect of competition in most retailing
industries (Levy & Weitz, 1992; Porter, 1985) and are also likely to be de-
cided at the executive level. Furthermore, both advertising and R&D costs
must be expensed in the period in which they are incurred, ensuring sys-
tematic data for research purposes.

To identify industries in which those variables represented critical de-
cisions, we used historical expenditure levels as an indicator of criticality.
According to the annual *Business Week* Industry R&D Survey (1984–87), the
computer, pharmaceutical, and measurement instrument industry groups
ranked either first, second, and third in R&D expenditures as a percentage of
sales over this time period, with industry group defined at the three-digit SIC
code level. Similarly, according to the *Advertising Age* annual survey for
1984 through 1987, the retailing industry group consistently outranked most
other industry groups in total advertising expenditures. (Data on advertising
as a percentage of sales were not available.) Because critical decision vari-
ables were identifiable, we chose the four industry groups named as the basis
for the selection of companies for study.

Company performance measures were based on financial data for 1986.
We drew CEO compensation data from 1986 and 1987 proxy statements.
Thus, the basic model examined represented a one-period lagged relation-
ship in which company performance in 1986 was the independent variable
and the change in CEO compensation from 1986 to 1987 was the dependent
variable. Our measure of decision making was based on operating data from
the years 1982 through 1986. Details of all measures are discussed below.

Selection of Companies

The following steps were taken to obtain the final group of companies
studied. First, we used Standard and Poor's COMPUSTAT data file to iden-
tify all firms within the four industry groups of interest (pharmaceuticals,
computers and related products, measurement instruments, and retailing).
These four broadly defined industry groups actually contained several un-
derlying four-digit-SIC-code industries. We used this more narrow defini-
tion of industry to identify an initial group of companies on COMPUSTAT
and for all subsequent analysis. Gathering financial data on each company
from COMPUSTAT for the years 1982–86 yielded complete data on 372
companies in 42 four-digit-SIC-code industries. Next, we examined the
proxy statements of those companies to obtain CEO compensation data for
the years 1986 and 1987. Many firms did not disclose complete information

about stock options; these were eliminated, as were companies in which the CEO had changed within the two-year measurement period. Also, because disruptions in firm activities occur from takeovers, we excluded companies from the study if they had been involved in a merger or acquisition in either 1986 or 1987. After these steps, 72 companies remained.

Of the 72, 2 were conglomerates and 7 derived more than 20 percent of total revenues from operations unrelated to their four-digit defining industry. These were deleted from the study to ensure the validity of comparisons to industry reference groups. We made this determination using annual reports providing details of segment-level financial results in accordance with financial reporting requirements (American Institute of Certified Public Accountants, 1976). Table 1 lists by industry group the final group of 63 companies. For each firm, Table 1 also lists the four-digit SIC code used in subsequent analyses, 1986 sales, and industry mean sales.

Representativeness

Although statistical testing cannot completely verify the validity of selection procedures, we conducted several tests to increase our confidence about the representativeness of the firms studied. In these and all subsequent analyses, we compared the firms to their four-digit SIC industries, as listed in Table 1, on several dimensions. Mean sales, as a measure of size, were compared to industry mean sales with a two-sample t-test. With only one exception (the computer equipment industry, SIC 3680, containing only two companies), no significant difference was found, suggesting that our group was reasonably representative on size. Also, company expenditures on R&D and advertising, both standardized as a proportion of sales, were compared to industry expenditures. Means for our data were not significantly different from industry means using a two-sample t-test, suggesting that the firms studied did not systematically differ from their respective industries in expenditures on decision variables. Only industries containing two or more studied companies could be statistically tested.

As a general check on the firms and measures we employed, our data were compared to those reported in previous research. Gibbons and Murphy (1990) examined the relationship of compensation to shareholder market returns for a large sample of CEOs and companies. Our results for cash compensation can be compared to theirs with the following ordinary-least-squares (OLS) regression model:

$$\Delta \ln(cash\ compensation) = b_1 + b_2\ (industry\ return) + b_3\ (company\ return). \quad (1)$$

Though not reported separately, our coefficient estimate for company market return (b_3) was 0.20 ($p < .01$), corresponding to Gibbons and Murphy's estimate of 0.16 (1990: 38) and to Murphy's (1985: 33) coefficient estimate of 0.11 for salary and bonus on market return with additional control variables. Our estimate for industry return (b_2), -0.01, though not sta-

TABLE 1
Companies and Industries Studied

Companies and Industries	1986 Sales[a]	Number of Companies in Same Industry on COMPUSTAT®	1986 Mean Industry Sales[a]
Computers, high technology			
Semiconductors, SIC group 3674		69	237,478
Dionics, Inc.	2,807		
International Rectifier Corporation	145,167		
Electronic connectors, SIC group 3678		16	274,074
Molex, Inc.	291,913		
Thomas & Betts Corporation	347,400		
Electronic components, SIC group 3679		87	38,531
Algorex Corporation	16,453		
Data Design Laboratories	67,393		
Del Electronics Corporation	5,325		
General Microwave Corporation	20,497		
Nuclear Data	55,856		
Recoton Corporation	28,728		
Washington Scientific Industries	31,008		
Computer equipment, SIC group 3680		17	10,611,070
Data General Corporation	1,267,959		
North Atlantic Industries, Inc.	35,242		
Measurement instruments			
Aerospace, SIC group 3812		56	837,258
DBA Systems, Inc.	74,354		
Automatic controls, SIC group 3822		13	895,931
Watsco, Inc.	15,068		
Measurement instruments, SIC group 3823		36	55,135
Fischer & Porter Company	176,670		
Foxboro Company	543,986		
Measurex Corporation	192,707		
Fluid meters, SIC group 3824		5	56,005
Badger Meter, Inc.	60,947		
Electronic instruments, SIC group 3825		44	81,683
Bowmar Instrument Corporation	54,401		
Genrad, Inc.	204,316		
Wavetek Corporation	73,824		
Laboratory instruments, SIC group 3826		22	131,671
Finnigan Corporation	87,795		
Millipore Corporation	443,092		
Perkin-Elmer Corporation	1,290,558		
Optical instruments, SIC group 3827		21	20,778
Tinsley Laboratories, Inc.	6,804		
Medical instruments, SIC group 3841		65	67,491
Bio-Medicus, Inc.	9,404		
Cobe Laboratories, Inc.	174,012		
Electromedics, Inc.	12,915		
Stryker Corporation	121,050		

TABLE 1 (continued)

Companies and Industries	1986 Sales[a]	Number of Companies in Same Industry on COMPUSTAT®	1936 Mean Industry Sales[a]
Surgical instruments, SIC group 3842		56	32,862
Puritan-Bennett Corporation	149,718		
Electro-medical, SIC group 3845		75	29,715
Concept, Inc.	30,132		
Staodynamics, Inc.	7,950		
Photographic equipment, SIC group 3861		43	1,071,880
Chyron Corporation	35,635		
Retail			
Building materials, SIC group 5211		20	610,246
Scotty's, Inc.	493,895		
Department stores, SIC group 5311		39	4,440,030
Alexander's, Inc.	520,129		
Mercantile Stores Company	2,028,201		
Variety stores, SIC group 5331		42	2,245,720
Zayre Corporation	4,036,018		
Grocery stores, SIC group 5411		60	2,555,360
Cullum Companies	1,036,450		
Kroger Company	17,122,504		
Winn-Dixie Stores, Inc.	8,225,242		
Auto dealers, SIC group 5600		11	594,858
Evans, Inc.	156,635		
Home equipment, SIC group 5700		8	163,961
Three D Department	44,596		
Furniture stores, SIC group 5712		15	174,278
J. Michaels, Inc.	10,984		
R B Industries, Inc.	105,192		
Restaurants, SIC group 5812		161	250,487
Consul Restaurant Corporation	72,743		
Jerrico, Inc.	562,140		
Panchos Mexican Buffet, Inc.	43,104		
Southern Hospitality Corporation	43,205		
Drug stores, SIC group 5912		26	1,855,880
Walgreen Company	3,660,552		
Pharmaceuticals			
Pharmaceuticals, SIC group 2834		87	852,121
Abbott Laboratories	3,807,634		
Bolar Pharmaceutical Company, Inc.	55,229		
Bristol-Myers Company	4,835,898		
Comnet Corporation	40,755		
DDI Pharmaceuticals	2,983		
International Minerals & Chemical	1,177,700		
Eli Lilly & Company	3,720,400		

TABLE 1 (continued)

Companies and Industries	1986 Sales[a]	Number of Companies in Same Industry on COMPUSTAT®	1986 Mean Industry Sales[a]
Marion Laboratories	399,267		
Natures Sunshine Products, Inc.	31,072		
Rorer Group	844,578		
Schering-Plough	2,398,699		
Smithkline Beckman Corporation	3,745,400		
Squibb Corporation	1,784,629		

[a] Figures represent thousands of dollars.

tistically significant for our firms, approximates Gibbons and Murphy's estimate for four-digit-SIC-code industry market return of -0.03.

Measures of Executive Compensation

Our measure of CEO compensation consisted of two components, cash and executive stock options. Cash compensation included salary, bonuses, and deferred amounts. We included deferred compensation because it was invariably found to be exercisable at the discretion of the executive. Although perquisites also represent compensation, they were not included because the value of such perquisites as insurance plans and company cars was generally not significant relative to that of cash and stock options. Moreover, the range of reported perquisites was not great across firms.

We included stock options in this analysis because they are an important component of executive compensation (Noreen & Wolfson, 1981). Options allow the future purchase of stock at a fixed price. Thus, given the probability of a stock price increase, options have a significant value to a manager. Valuation of stock options, however, is problematic. Historically, some studies have employed valuation methods based on the Black and Scholes (1973) model (e.g., Murphy, 1985); others have used a heuristic valuation based on the difference between an option's exercise price and the market price of a firm's stock (e.g., Benston, 1985); still others have ignored the value of stock options altogether, citing fundamental measurement problems (e.g., Kerr & Bettis, 1987). Although Noreen and Wolfson (1981) showed that the Black-Scholes option-pricing model is reasonably accurate at predicting the prices of marketable warrants, which resemble executive stock options, the model makes assumptions that are not altogether valid for executive stock options. Unlike marketable warrants, executive stock options are not transferrable and cannot be exercised once an executive leaves a firm; in addition, the model's assumption of a constant variance for stock price can be readily violated through managers' actions (Lambert & Larcker, 1985). Thus, the Black-Scholes model will probably overstate the value of

executive stock options relative to that of marketable warrants because it is less likely that executive stock options will be exercised (Noreen & Wolfson, 1981). On the other hand, a heuristic valuation is likely to understate the value of options since it implies that an option has no value unless the market price of the corresponding stock exceeds the exercise price of the option.

Despite these measurement problems, ignoring the value of stock options altogether would have seriously distorted measures of total compensation and excluded a significant economic motivator. For this study, therefore, we valued executive stock options using both the Black-Scholes model and a heuristic valuation. In both cases, we assessed only options that were granted during the study period to avoid the spurious correlation resulting from the mechanical relationship between previously granted options and current company performance. We may thus have underestimated the incentive effect of stock options since our model ignores the value of previously granted stock options.

Because executive options are always granted at the market price of the corresponding stock, we used the following simplified version of the Black-Scholes option valuation model (Antle & Smith, 1985; Noreen & Wolfson, 1981):

$$option\ value = price \times shares \times [\exp(-dt)N(Z) \\ - \exp(-rt)N(Z - s\sqrt{t})], \tag{2}$$

where

price	= the exercise price of an option,
shares	= the number of shares granted,
d	= the dividend yield approximated as ln $[1 +$ (dividends per share in year $i - 1$/closing stock price in year i)],
t	= the time to the expiration of the option, either five or ten years,[1]
N	= the standard normal probability distribution function,
r	= the risk-free interest rate, based on five- and ten-year average yields on U.S. government securities,
s	= the stock return variance for the previous five years,

and

Z $= (r - d + s^2/2) \times (t/s\sqrt{t}).$

Since this model provides option values on the date of a grant, it rests on the assumption that options are marketable and sold on that day. As in previous research, we used dividends for the previous year to calculate dividend yield to avoid the mechanical relationship between performance and the value of options (Murphy, 1985).

Using an alternative valuation method, we also valued options in terms of the difference between their exercise price and a firm's stock price on the

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[1] When time to the expiration of the option was not disclosed in the proxy statement, we used 10 years.

last day of the year of a grant. Unlike the Black-Scholes model, this heuristic method rests on the assumption that options are exercised on the last day of the year, but only if there is a positive difference between the market price of the stock and the option price. Previous studies of executive compensation have used this valuation method (e.g., Benston, 1985; Lewellen, Loderer, & Martin, 1987).

In summary, three different measures of compensation were used in the subsequently reported analysis: (1) cash compensation, (2) cash compensation plus stock options valued using the Black-Scholes model, and (3) cash compensation plus stock options valued at the closing market price for the year in which options were granted. We adjusted each measure for inflation to represent 1986 constant dollars using the Consumer Price Index.

The change in the logarithm of compensation from 1986 to 1987 was our dependent variable. We used logarithm change values for three reasons. First, they measure growth rate in compensation and are readily comparable to the rates-of-return measures commonly used to evaluate firm performance. Second, they provide results comparable to those of previous empirical research in this area (e.g., Antle & Smith, 1986; Gibbons & Murphy, 1990). Third, they avoid the potential misspecification problems arising from using absolute compensation levels. Absolute compensation is likely to depend on factors other than performance, such as firm size (Baker, Jensen, & Murphy, 1988; Murphy, 1985).

Corporate Performance Measures

Agency theory provides little guidance on appropriate measures of performance, suggesting only that additional information about a manager's decision making will incrementally improve performance evaluation (Holmstrom, 1979, 1982). Previous research has measured company performance using accounting-based measures (e.g., O'Reilly, Main, & Crystal, 1988), market-based measures (e.g., Coughlin & Schmidt, 1985), and both types of measure together (e.g., Antle & Smith, 1986). Both types have conceptual and methodological weaknesses as measures of performance (Keats, 1990; Lubatkin & Shrieves, 1986). Accounting measures are subject to management manipulation and may not correlate significantly with firm value (Lubatkin & Shrieves, 1986). On the other hand, a company's stock market performance is also sensitive to numerous factors beyond the control of management, so market-based measures may also be an inadequate indicator of CEO performance (Jensen & Murphy, 1990).

To avoid the biases inherent in using either method alone, we used both an accounting-based and a market-based measure of performance in this study. Both measures were based on rates of return to facilitate comparisons to each other, to previous research, and to the measure of compensation (change in its logarithm). We defined return on average assets (ROA), the accounting-based measure, as net income divided by average total assets. This measure has been used in previous research and has also been shown

to be highly correlated with other accounting measures, such as return on equity (Antle & Smith, 1986).

The market-based measure was market return in fiscal year 1986 defined according to the following:

$$market\ return_{1986} =$$

$$\frac{closing\ stock\ price_{1986}\ +\ dividends\ per\ share_{1986}}{closing\ stock\ price_{1985}} - 1, \qquad (3)$$

Dividends per share is adjusted for stock dividends and splits.

Since both economic theory and previous empirical research provide a rationale for evaluating performance on a relative basis (Gibbons & Murphy, 1990; Holmstrom, 1982), we also examined performance relative to industry and to the prior fiscal year, 1985.

Performance relative to industry was defined as follows:

$$performance\ relative\ to\ industry_{j1986} =$$

$$performance_{j1986} - performance_{Ij1986}, \qquad (4)$$

where performance for firm j and industry performance for firm j is defined as market return (as estimated in Equation 3) or as ROA. (As noted above, in these analyses, industry was defined in terms of four-digit SIC codes.)

Performance relative to the prior fiscal year was defined as:

$$performance\ relative\ to\ prior\ year_{j1986} =$$

$$performance_{j1986} - performance_{j1985}. \qquad (5)$$

Unique Decision Making

If, as expected, expenditures on R&D and advertising, which we henceforth call the "decision variables," are critical decisions for the industries studied, some portion of each firm's expenditure is required merely to maintain industry membership. That is, risks shared systematically with other firms in an industry explain a portion of the expenditures on the decision variables. Another portion represents the unique decisions of a firm. Thus, expenditures on the decision variables consist of both a common component, representing a response to environmental forces faced by an industry as a whole, and a unique component, representing attempts to outmaneuver the competition or responses to environmental forces unique to a firm.

Thus, to represent the unique decisions made, or agreed to, by each firm's CEO, we needed a measure of the portion of the expenditure on a decision variable that could not be explained by the movement of the industry group. We measured this variable, unique decision making, using the following procedure. First, a five-year history of firm and industry expenditures on decision variables was developed from COMPUSTAT. For each firm, we standardized the level of expenditure as a proportion of net sales.

Next, to decompose each firm's expenditure into common and unique components, we conducted a time series regression analysis of industry on firm expenditures for each firm for the 1982 to 1985 period, according to the following:

$$\text{expenditure on decision variable}_{jt} = a_{jt} + b_{jt}(\text{industry expenditure on}$$
$$\text{decision variable}_{jt}) + e_{jt},$$
$$t = 1982, \ldots 1985, \qquad (6)$$

where e_{jt} represents the error term for firm$_j$ in year$_t$.

Next, we used the 63 regression relationships developed using Equation 6 to predict the level of expenditure for each firm in the year of interest, 1986, and to provide the measure of unique decision making according to the following:

$$\text{unique decision making}_{j1986} = \text{expenditure on decision variable}_{j1986}$$
$$- [a_{jt} + b_{jt}(\text{industry expenditure on}$$
$$\text{decision variable}_{j1986})], \qquad (7)$$

where the first term on the right represents the actual expenditure of each firm on the decision variable in 1986, a_{jt} and b_{jt} are the time series OLS coefficients from Equation 6, and the term in parentheses represents each firm's predicted value for 1986 using its specific coefficient from Equation 6. Thus, we used each firm's residual (from the predicted value of the variable) to measure the unique portion of the CEO's decision.

The absolute size of a residual provides information to evaluators because it signals how much a CEO's behavior differed from general industry trends. The sign of the residual in Equation 7, however, conveys little information unless an evaluator knows that a positive (or negative) deviation from prediction (a decision to overspend or underspend), was better than its alternative. Given information asymmetry, it is unlikely that evaluators can make such a judgment (Eisenhardt, 1988). We therefore used the absolute value of the residual from Equation 7 to construct our measure of unique decision making. A logarithmic transformation was used for subsequent data analysis.

The OLS regression analyses used to construct our measure of unique decision making indicated a consistent positive relationship between firm and industry levels for the decision variables. The percentage of variation in firms' expenditures on the decision variables explained by industry variations (R^2) ranges from 0.01 to 0.99. The first quartile and the fourth quartile were at 0.15 and 0.63, respectively, with a median of 0.40. Thus, there was a reasonable basis for using the empirical relationships within the industries to predict firm expenditures in the year of interest. We judged first-order autocorrelation to be problematic as 10 of the 63 regression models yielded a significant Durbin-Watson statistic ($p < .05$), and in 4 models the statistic was inconclusive. Statistical theory suggests, however, that although auto-

correlated data may cause underestimates of the variances of OLS coefficients, point estimates of the coefficients will remain unbiased (Neter & Wasserman, 1974). Thus, the coefficients can be used for prediction, and we so used them here (Johnston, 1984).

Control Variables

Five additional variables were tested to control for potential confounds of the proposed relationships. We include three of these variables in the reported results. They are (1) concentrated stock ownership by outsiders, (2) industry performance, and (3) the proportion of insiders on a board of directors. We defined insiders as current and past managers of a firm. Previous research has suggested that these variables may alter the form of the compensation-performance relationship.

Concentrated stock ownership by outsiders was included because previous research has suggested that monitoring of management by outsiders is more likely once some significant level of ownership concentration is reached. Gomez-Mejia, Tosi, and Hinkin (1987) found evidence that externally controlled firms, with presumably high monitoring, were more likely to tie executive compensation to firm performance than other firms. Although a specific level of concentrated outside ownership is difficult to justify on theoretical grounds, Gomez-Mejia and colleagues found significant differences using a 5 percent threshold. Thus, given no reason to expect other threshold levels to be more appropriate, and following prior research, we measured outsider stock ownership as a dichotomous variable set to 1 if 5 percent of a firm's stock was owned by a single individual or organization that was not a manager of the company and to 0 otherwise. Of the 63 firms studied, 32 had a 5 percent block of stock owned by a single outside owner.

Industry performance was also included in the analysis to control for industry trends (Gibbons & Murphy, 1990). We defined industry performance as either mean market return or ROA, as appropriate. Industry trends may influence evaluators' perceptions of management's performance. As discussed above, the efficiency of compensation contracts can be improved by the incorporation of information about the outcomes of other agents facing similar business risk (Antle & Smith, 1986).

The proportion of insiders on a board of directors was included to control for the relative monitoring ability of the board. Boards with high monitoring ability may be better able to evaluate a CEO's decision making. Baysinger and Hoskisson (1990) have suggested that the presence of insiders on a board facilitates qualitative assessment of management behavior. In addition to main effects, we tested interactions with performance and unique decision making; they are not separately reported because no significant relationships were found.

Two additional control variables, firm size (measured as the logarithm of total sales) and industry group membership, were also tested but are not

included in the reported results primarily because we did not find adequate theoretical justification for doing so. Size has been associated with compensation levels in previous cross-sectional research. This association is not surprising, as the CEO's job in a large firm may be more complex than it is in a small one (Baker et al., 1988), and large firms, which can afford high compensation, may attract more talented managers than small firms (O'Reilly et al., 1988). However, our analysis used rates of change in compensation as the dependent variable, not absolute compensation amounts. We did not expect, therefore, that including firm size would significantly affect the proposed relationships. It did not; the results with size included in the analysis were virtually identical to the results as reported.

To gain some assurance that the presence of certain industry groups in the data did not drive our results, we controlled for industry by using a dummy variable to represent the four industry groups. (The size of the data set precluded controlling for four-digit SIC industry.) Because our theoretical framework makes no distinction for industry membership, we did not expect our results to be industry-specific, and they were not. Industry membership had virtually no effect on the results reported below.

Finally, to ensure that our industry classifications were stable over time, we checked the four-digit SIC codes for each firm for each measurement year using Standard and Poor's *Corporation Directory* for 1982 through 1986. Industry membership was found to be highly stable, with 57 firms (90%) maintaining the same SIC code over the five-year period. Four firms were not listed for the full five years, but they showed no changes in SIC codes in the listed years. Of the remaining firms, all remained within their respective two-digit categories. Given these findings, we judged industry stability for our companies to be high. Because historical SIC codes are not available on COMPUSTAT, however, it is not possible to evaluate the effects of changing industry membership on the composition of the industry reference groups.

RESULTS

Descriptive Statistics

Table 2 presents descriptive statistics for the variables in the study. As expected, the Black-Scholes model provided significantly higher estimates (with significantly greater variance) for the value of stock options than did the heuristic model. Table 3 presents variable intercorrelations. The accounting- and market-based performance measures are correlated, as expected, as are the compensation measures. The negative correlation between company size and outsider stock ownership is not surprising, since concentrated stock ownership is more likely to occur in small companies. Outside stock ownership was also found to be correlated with three of the performance measures. The practical significance of this finding is limited, however, as outsider ownership explained less than 10 percent of the variance in each performance measure, and the sign of the correlation was inconsistent

TABLE 2
Descriptive Statistics

Variables	Means	Standard Deviations	Minimum	Maximum
Company performance				
Market return	0.15	0.45	−0.71	1.73
Return on assets	0.04	0.09	−0.30	0.21
Compensation				
Cash				
Absolute change	23,924	86,777	−145,753	267,869
Change in logarithm	0.04	0.24	−0.69	0.55
Cash + stock options, year-end price				
Absolute change	52,562	203,408	−921,629	884,381
Change in logarithm	0.09	0.38	−1.18	0.92
Cash + stock options, Black-Scholes				
Absolute change	86,039	1,243,371	−6,654,096	4,989,103
Change in logarithm	0.13	0.66	−2.20	1.88
Unique decision making	−2.67	1.75	−6.88	1.51
Controls				
Proportion of insiders on board	0.38	0.18	0.13	0.86
Company size[a]	1,064	2,599	3	17,123
Outsider owns 5 percent of stock?	0.52			

[a] Entries represent millions of dollars in sales.

across the measures of performance. Table 3 also shows a rather sporadic relationship between compensation and performance. These findings are consistent with previous research reporting occasional bivariate relationships between compensation and various measures of company performance (Finkelstein & Hambrick, 1988).

Unique Decision Making as a Moderator

Moderated regression analysis was used to test the proposition that the presence of unique decision making affects the relationship between compensation and firm performance. We regressed the dependent variable— change in the logarithm of CEO compensation—on a set of predictor variables composed of the independent variable, company performance; control variables: industry performance, outside stock ownership, and the proportion of insiders on the board; the moderator, unique decision making; and the cross-product of the independent variable and the moderator. In such analyses, moderator effects are indicated by a significant t-statistic for the regression coefficient of the interaction term or by significant incremental change in the R^2 of the model after inclusion of the interaction term (James

TABLE 3
Correlations

Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. Market return												
2. Market return relative to prior year	.66**											
3. Market return relative to industry	.91**	.69**										
4. Return on assets	.58**	.11	.47**									
5. Return on assets relative to prior year	.34**	.15	.32*	.40								
6. Return on assets relative to industry	.56**	.07	.53**	.82**	.36**							
7. Change in logarithm, cash	.37**	.19	.35**	.24	.11	.33						
8. Change in logarithm, cash + stock options, year-end price	.34**	.23	.36**	.24	.18	.31*	.67**					
9. Change in logarithm, cash + stock options, Black-Scholes	.06	.10	.13	.16	.11	.21	.36**	.47**				
10. Unique decision making	-.01	.09	.02	-.20	.18	.05	.23	.24	-.05			
11. Proportion of insiders on board	-.12	.07	-.16	-.16	.07	-.19	.08	.02	-.11	.17		
12. Outsider owns 5 percent of stock?	.13	.29*	.21	-.27*	.08	-.26*	-.15	-.05	-.14	.12	.01	
13. Company size	.12	.01	-.05	.15	-.05	-.04	-.06	-.09	.04	-.21	-.07	-.32*

* $p < .05$
** $p < .01$

& Brett, 1984). Thus, to test the proposition that unique decision making moderates the relationship between firm performance and compensation, we estimated the following model using OLS regression:

$$
\begin{aligned}
\Delta \ln(CEO\ compensation) = {}& b_1 + b_2\ (industry\ performance) \\
& + b_3(outside\ stock\ ownership) \\
& + b_4(proportion\ of\ insiders\ on\ board) \\
& + b_5(company\ performance) \\
& + b_6(unique\ decision\ making) \\
& + b_7(company\ performance \times unique \\
& decision\ making). \qquad (8)
\end{aligned}
$$

Separate analyses were done for performance defined as market return and as ROA. A significant coefficient estimate for the interaction term (b_7) would support the proposition because it would indicate that the relationship of performance to compensation differed for different levels of unique decision making.

Table 4 shows the results of OLS regressions (Equation 8) for performance measured as the market rate of return. We measured compensation as cash plus stock options (in models 1–3) and as cash only in models 4–6. Only the results for the Black-Scholes option valuation model are reported as results using year-end stock prices to value options (the heuristic model) were virtually identical to the reported results. The performance measure in models 1 and 4 is raw market return; in models 2 and 5 it is market return relative to the previous fiscal year; and in models 3 and 6 it is market return relative to industry.

Models 4, 5 and 6, using the change in the logarithm of cash compensation as the compensation measure, produced statistically significant estimates for the interaction term (b_7). These results suggest that unique decision making moderated the relationship between all three measures of performance and cash compensation. Models 1–3, however, did not produce significant estimates for the interaction term, indicating that our three measures of market return were not significantly associated with change in the logarithm of cash plus options. Thus, evidence in support of the proposition that unique decision making moderates the relationship between stock market performance and compensation is mixed, but supportive for change in the logarithm of cash compensation.

The interaction plot shown in Figure 2 demonstrates the interaction between unique decision making and relative market return. This plot was constructed with the two variables split at their medians. Endpoints on the plot represent group means for change in the logarithm of cash compensation at the indicated levels of unique decision making and relative market return. This plot clearly shows that the relationship between performance and compensation depends on the level of unique decision making, as predicted. A significant performance-compensation relationship was present

TABLE 4
Results of Regression Analysis for Market Returns and Unique Decision Making[a]

Independent Variables	df	Change in Logarithm of Cash Compensation + Stock Options			Change in Logarithm of Cash Compensation		
		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept		0.40	0.49	0.42	0.10	0.18	0.13
		(1.41)	(1.72)	(1.48)	(1.16)	(1.92)	(1.46)
Four-digit-SIC-industry return	1	-0.79	-0.68	-0.73	-0.12	0.04	0.04
		(-1.59)	(-1.43)	(-1.50)	(-0.81)	(0.27)	(0.27)
Outsider owns 5 percent of stock?	1	-0.26	-0.30	-0.27	-0.13	-0.14	-0.13
		(-1.47)	(-1.69)	(-1.57)	(-2.47*)	(-2.33*)	(-2.42*)
Proportion of insiders on board	1	-0.23	-0.36	-0.22	0.11	-0.02	0.13
		(-0.46)	(-0.75)	(-0.45)	(0.73)	(-0.12)	(0.88)
Market rate of return	1	0.25			0.46		
		(0.75)			(4.44**)		
Return relative to prior year	1		0.35			0.38	
			(1.09)			(3.67**)	
Return relative to industry	1			0.53			0.46
				(1.50)			(4.24**)
Unique decision making	1	-0.01	-0.02	-0.02	0.01	0.02	0.03
		(-0.26)	(-0.36)	(-0.34)	(0.83)	(1.48)	(1.88)
Performance × unique decision making	1	0.02	0.06	0.15	0.11	0.10	0.11
		(0.18)	(0.60)	(1.12)	(2.74**)	(3.15**)	(2.57*)
F	6	0.79	0.96	1.01	4.95**	3.49**	4.75**
R^2		0.08	0.09	0.10	0.35	0.27	0.34
Incremental R^2 from interaction		0.00	0.01	0.02	0.09	0.13	0.08

[a] $N = 63$. Values in parentheses are t-statistics.
* $p < .05$
** $p < .01$

FIGURE 2
Interactive Effects[a]

Change in Logarithm of CEO Cash Compensation
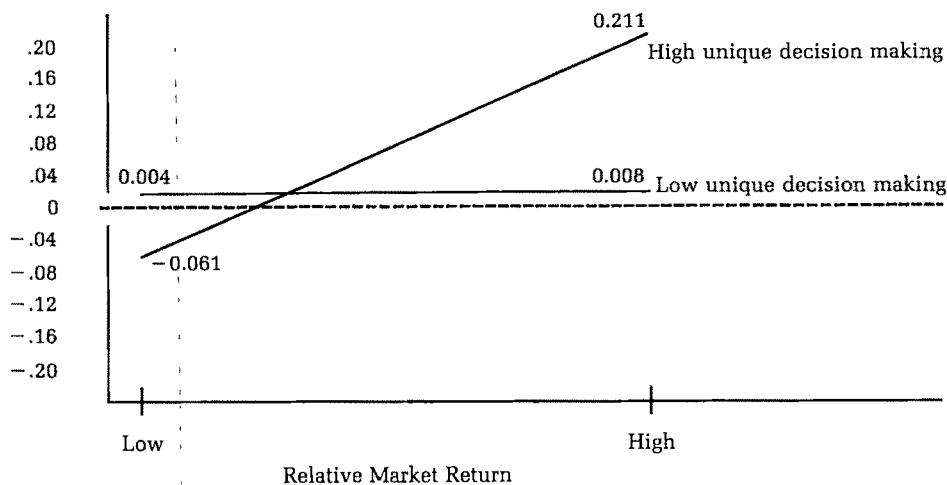
[a] Endpoints on this plot represent group means.

when unique decision making was high. When it was low, differences in performance were associated with only minor differences in compensation.

A similar OLS regression model (Equation 8) was next estimated for ROA; Table 5 shows results. (Again, we report only results for the Black-Scholes option valuation model because results using the heuristic model were virtually identical.) Models 1–6 correspond to those reported in Table 4 except that the performance measure is now ROA. In this analysis, model 6 provided a statistically significant estimate for the interaction term (b_7), indicating that unique decision making moderated the relationship between ROA relative to industry and change in the logarithm of cash compensation. The other ROA models, however, did not produce significant results, although the estimate for the interaction term in model 3 was marginally significant $(p < .07)$. Like results for the market-based performance measure, this analysis provided mixed evidence in support of the proposition that unique decision making moderates the relationship between compensation and performance. Again, the results relative to change in the logarithm of cash compensation were supportive. The nature of the interaction in model 6 is similar to that shown in Figure 2 for market return.

The regression results reported in Tables 4 and 5 show positive relationships between five of the six measures of company performance and cash compensation. In contrast, none of the models for cash plus options showed a significant, positive relationship to company performance.

TABLE 5
Results of Regression Analysis for Return on Assets and Unique Decision Making[a]

Independent Variables	df	Change in Logarithm of Cash Compensation + Stock Options			Change in Logarithm of Cash Compensation		
		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept		0.19	0.17	0.03	0.06	0.10	0.01
		(0.57)	(0.52)	(0.08)	(0.56)	(0.84)	(0.05)
Four-digit-SIC-industry ROA	1	-1.55	-1.66	-2.28	-0.59	-0.55	-0.41
		(-0.99)	(-1.03)	(-1.18)	(-1.12)	(-0.96)	(-0.63)
Outsider owns 5 percent of stock?	1	-0.18	-0.19	-0.19	-0.06	-0.08	-0.07
		(-0.98)	(-1.06)	(-1.06)	(-1.03)	(-1.36)	(-1.12)
Proportion of insiders on board	1	-0.31	-0.31	-0.23	0.11	-0.08	0.14
		(-0.63)	(-0.62)	(-0.47)	(0.65)	(-0.44)	(0.84)
ROA	1	2.06			1.16		
		(1.62)			(2.70**)		
ROA relative to prior year	1		1.75			0.39	
			(0.72)			(0.46)	
ROA relative to industry	1			2.45			1.31
				(1.95)			(3.09**)
Unique decision making	1	-0.05	-0.04	-0.08	0.02	0.02	0.01
		(-0.86)	(-0.70)	(-1.31)	(1.07)	(1.10)	(0.46)
Performance × unique decision making	1	0.88	0.22	1.02	0.30	0.05	0.36
		(1.41)	(0.22)	(1.91)	(1.42)	(0.14)	(2.01*)
F	6	0.96	0.68	1.26	2.43*	1.15	2.83*
R^2		0.09	0.07	0.12	0.21	0.11	0.23
Incremental R^2 from interaction		0.03	0.01	0.06	0.03	0.00	0.06

[a] $N = 63$. Values in parentheses are t-statistics.
* $p < .05$
** $p < .01$

DISCUSSION

This study investigated the relationship between unique CEO decision making and CEO compensation. It extended previous research on relative evaluation of performance outcomes to relative evaluation of CEO decisions. Our results suggest that CEO decision making was an important factor in determining the compensation of chief executives in the companies studied. When decisions were unique relative to a reference industry, both raw and relative stock market returns related significantly to subsequent changes in cash compensation. Similarly, when decisions were unique, ROA performance relative to industry related significantly to changes in cash compensation.

These results are consistent with the argument that evaluators seek information that allows a more accurate assessment and attribution of responsibility for outcomes than would be feasible if they lacked the information. Support thus emerges for the idea that behavioral information is useful in CEO evaluation. By implication, it appears that it is through the addition of behavioral information that performance outcomes become informative to evaluators. When management decisions differ from expectations, there is an informational basis on which to attribute results, whether positive or negative, to management. Performance-based compensation follows logically from that attribution. However, when decisions are simply in keeping with industry norms, performance outcomes provide a weaker basis for attributing causality to management decisions. Competing explanations may include any combination of external forces that normally affect industry performance. Under such conditions, boards may determine compensation on the basis of input measures, such as an organization's size or number of employees. These variables, however, are unlikely to be adequate surrogates for managerial effort, skill, and ability, and critics have often cited them as inappropriate determinants of executive compensation (e.g., Drucker, 1984; Loomis, 1982).

Our results also suggest that, to the extent the posited relationships were present, they focused primarily on cash compensation. None of the tests for cash plus options produced significant interactions. At the same time, the main-effect relationship between performance and compensation was also present only for cash compensation. None of the models based on Equation 8 using change in the logarithm of cash plus options as the dependent variable produced significant coefficient estimates for company performance. By implication, it seems that cash compensation served as a direct response to performance, but option compensation was determined on some other basis. Other studies have also suggested that stock options are not a performance-based reward (Kerr, 1985). Murphy (1985), also using the Black-Scholes model, reported a negative relationship between market return and stock option value and concluded that option awards are used to provide motivation in periods succeeding the awards. In fact, companies often reissue "out-of-the-money" options—options with an exercise price exceeding the cur-

rent stock price—at a lower exercise price, presumably to recapture their motivational effect. Thus, options may function as an incentive for future performance, but cash and other compensation elements function as a reward for past performance (Lambert & Larcker, 1985).

The findings of this study are of interest first because they support a strong theoretical rationale for relative evaluation in compensation contracts (Holmstrom, 1979, 1982) and second because they provide evidence of relative evaluation through both accounting- and market-based performance measures. In contrast, Antle and Smith (1986) found some evidence of relative performance evaluation using an accounting-based performance measure (return on assets) but only weak evidence for it using stock returns. Conversely, Gibbons and Murphy (1990) found clear evidence of relative performance evaluation for stock returns but none for return on assets. Neither study offered an explanation for those inconsistencies.

The present findings are also of interest because they introduce the possibility that behavioral information plays an important part in the evaluation and compensation of CEOs. Agency theorists have often assumed that information asymmetry eliminates the ability of principals to evaluate agent behaviors. Our results suggest otherwise. First, it appears that relative decision monitoring may partially compensate for a board's inability to judge the quality of a CEO's decisions directly. Although it would be ideal for purposes of evaluation for a board to know that a CEO should have spent more or less than competitors on R&D or advertising, it may be sufficient that the board know only that its CEO did in fact spend differently than his or her peers. In terms of attributing responsibility for results, knowing the extent of the CEO's difference from industry norms—the absolute deviation—may help offset the board's inability to know what the CEO should have done (the preferred direction of deviation).

Second, it also appears that boards may have considerable access to information on CEO operating decisions as well as on the decisions of competitors and may be capable of incorporating that information into the evaluation process. This suggestion is in keeping with recent arguments that inside board members serve as important conduits for qualitative, and otherwise unavailable, information on CEO performance (Baysinger & Hoskisson, 1990; Walsh & Seward, 1990) and that such information improves the quality and efficiency of the evaluation process (Holmstrom, 1979, 1982). Taken together, these inferences suggest that insiders may affect the linkage between performance and compensation by making available to a board information that qualifies financial results. Similarly, large shareholders may have an incentive to seek out better information through independent channels (Gomez-Mejia et al., 1987). Although our analysis did not reveal insider or ownership effects, it appears that research focused specifically on such corporate governance factors is warranted.

The limitations of this research derive primarily from our method of operationally defining CEO decision making. The unique decision making measure was inferential in that it did not actually measure the objective

quality of CEO decisions or the monitoring behavior of evaluators. In addition, defining CEO decision making in terms of a single critical variable may have produced an overly conservative test of unique decision making's moderating effect. Evaluators, especially organizational insiders, are almost certain to have information on a wider, more informative set of decision variables than was represented here. Finally, the unique decision making measure limited the choice of variables to those for which published archival data were consistently reported and available. Thus, the study was constrained to industries in which R&D and advertising were critical decisions. It should be noted, however, that these limitations are primarily methodological and not conceptual. Virtually every industry entails the use of key strategic decision variables critical to maintaining competitive position (Porter, 1980, 1985). For evaluators familiar with an industry, these variables are obvious and accessible, and they provide information useful in evaluating decision makers. For researchers, the problem is identifying industries in which critical variables are reported in ways that provide useful data. Thus, there appear to be no industry-specific factors limiting the generalizability of these findings to other industries.

The findings of this study, as well as its limitations, suggest some useful directions for future research. In general, the area of relative evaluation appears to be a promising source of insight into the relationship between executive performance and compensation. Research on relative behavioral evaluation may be particularly useful in understanding the subtle but important process by which evaluators make comparative performance judgments and attributions. To address this area, research is needed that incorporates multidimensional measures of executive decision making. Field research that allows direct, in-depth examination of board monitoring behavior is also necessary.

Finally, research on contract design and the differential effects of market- and accounting-based performance measures is needed. Evidence from this study and from previous research indicates that accounting measures are not merely proxies for market returns (Lambert & Larcker, 1987). A CEO's ability to hedge risk through accounting manipulations may produce a range of incentives that influence the structure of compensation contracts (Antle & Smith, 1986). Of particular interest is the possibility that differences in contract design vary systematically with the strategic and financial objectives of firms.

REFERENCES

Alchian, A. A., & Demsetz, H. 1972. Production, information costs, and economic organization. *American Economic Review*, 62: 77–95.

American Institute of Certified Public Accountants. 1976. *Financial reporting for segments of a business enterprise.* Financial Accounting Standards Board no. 14. New York: AICPA.

Antle, R., & Smith, A. 1985. Measuring executive compensation: Methods and an application. *Journal of Accounting Research*, 23: 296–325.

Antle, R., & Smith, A. 1986. An empirical investigation of the relative performance evaluation of corporate executives. *Journal of Accounting Research,* 24: 1–39.

Baker, G. P., Jensen, M. C., & Murphy, K. J. 1988. Compensation and incentives: Practice vs. theory. *Journal of Finance,* 43: 593–616.

Baysinger, B. D., & Hoskisson, R. E. 1989. Diversification strategy and R&D intensity in large multiproduct firms. *Academy of Management Journal,* 32: 310–332.

Baysinger, B. D., & Hoskisson, R. E. 1990. The composition of boards of directors and strategic control: Effects on corporate strategy. *Academy of Management Review,* 15: 72–87.

Benston, G. J. 1985. The self-serving management hypothesis: Some evidence. *Journal of Accounting and Economics,* 7: 67–84.

Berle, A., & Means, G. 1968. *The modern corporation and private property.* New York: Macmillan.

Black, F., & Scholes, M. 1973. The pricing of options and corporate liabilities. *Journal of Political Economy,* 81: 637–654.

Ciscel, D. H., & Carroll, T. M. 1980. The determinants of executive salaries: An econometric survey. *Review of Economics and Statistics,* 62: 7–13.

Coughlin, A. T., & Schmidt, R. M. 1985. Executive compensation, management turnover, and firm performance: An empirical examination. *Journal of Accounting and Economics,* 7: 43–66.

Drucker, P. F. 1984. Reform executive pay or congress will. *Wall Street Journal,* 192 (April 24): 7.

Eisenhardt, K. M. 1985. Control: Organizational and economic approaches. *Management Science,* 31: 134–149.

Eisenhardt, K. M. 1988. Agency and institutional theory explanations: The case of retail sales compensation. *Academy of Management Journal,* 31: 488–511.

Eisenhardt, K. M. 1989. Agency theory: An assessment and review. *Academy of Management Review,* 14: 57–74.

Fama, E. F. 1980. Agency problems and the theory of the firm. *Journal of Political Economy,* 88: 288–397.

Fama, E. F., & Jensen, M. C. 1983. Separation of ownership and control. *Journal of Law and Economics,* 26: 301–325.

Finkelstein, S., & Hambrick, D. C. 1988. CEO compensation: A synthesis and reconciliation. *Strategic Management Journal,* 9: 543–558.

Gibbons, R., & Murphy, K. M. 1990. Relative performance evaluation for chief executive officers. *Industrial and Labor Relations Review,* 43 (special issue): 30s–51s.

Gomez-Mejia, L. R., Tosi, H., & Hinkin, T. 1987. Managerial control, performance, and executive compensation. *Academy of Management Journal,* 30: 51–70.

Holmstrom, B. 1979. Moral hazard and observability. *Bell Journal of Economics,* 10: 74–91.

Holmstrom, B. 1982. Moral hazard in teams. *Bell Journal of Economics,* 13: 324–340.

James, L. R., & Brett, J. B. 1984. Mediators, moderators, and tests for mediation. *Journal of Applied Psychology,* 69: 307–321.

Jensen, M. C., & Meckling, W. 1976. The theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics,* 3: 305–360.

Jensen, M. C., & Murphy, K. J. 1990. Performance pay and top management incentives. *Journal of Political Economy,* 98: 225–264.

Johnston, J. 1984. *Econometric methods* (3rd ed.). New York: McGraw-Hill.

Keats, B. W. 1990. Diversification and business economic performance revisited: Issues of measurement and causality. *Journal of Management,* 16: 61–72.

Kerr, J. 1985. Diversification strategies and managerial rewards: An empirical study. *Academy of Management Journal,* 28: 155–179.

Kerr, J., & Bettis, R. A. 1987. Boards of directors, top management compensation, and shareholder returns. *Academy of Management Journal,* 30: 645–664.

Lambert, R. A., & Larcker, D. F. 1985. Executive compensation, corporate decision making and shareholder wealth: A review of the evidence. *Journal of Accounting and Economics,* 7: 179–203.

Lambert, R. A., & Larcker, D. F. 1987. An analysis of the use of accounting and market measures of performance in executive compensation contracts. *Journal of Accounting Research,* 25 (Supplement): 85–125.

Levy, M., & Weitz, B. A. 1992. *Retail management.* Homewood, IL: Irwin.

Lewellen, W. G., & Huntsman, B. 1970. Managerial pay and corporate performance. *American Economic Review,* 60: 710–720.

Lewellen, W. G., Loderer, C., & Martin, K. 1987. Executive compensation and executive incentive problems: An empirical analysis. *Journal of Accounting and Economics,* 9: 287–310.

Loomis, C. J. 1982. The madness of executive compensation. *Fortune,* 109(12): 42–52.

Lubatkin, M., & Shrieves, R. E. 1986. Toward a reconciliation of market performance measures to strategic management research. *Academy of Management Review,* 11: 497–512.

McGuire, J. W., Chiu, J. S., & Elbing, A. O. 1962. Executive income, sales, and profits. *American Economic Review,* 52: 753–761.

Masson, R. T. 1971. Executive motivation, earnings, and consequent equity performance. *Journal of Political Economy,* 79: 1278–1292.

Morck, R., Shleifer, A., & Vishny, R. W. 1989. Alternative mechanisms for corporate control. *American Economic Review,* 79: 842–852.

Murphy, K. J. 1985. Corporate performance and managerial remuneration: An empirical examination. *Journal of Accounting and Economics,* 7: 11–42.

Neter, J., & Wasserman, W. 1974. *Applied linear statistical models.* Homewood, IL: Irwin.

Noreen, E., & Wolfson, M. 1981. Equilibrium warrant pricing models and accounting for executive stock options. *Journal of Accounting Research,* 19: 384–398.

O'Reilly, C. A., III, Main, B. G., & Crystal, G. S. 1988. CEO compensation as tournament and social comparison: A tale of two theories. *Administrative Science Quarterly,* 33: 257–274.

Oviatt, B. M. 1988. Agency and transaction cost perspectives on the manager-shareholder relationship: Incentives for congruent interests. *Academy of Management Review,* 13: 214–225.

Porter, M. E. 1980. *Competitive strategy.* New York: Free Press.

Porter, M. E. 1985. *Competitive advantage.* New York: Free Press.

Porter, M. E. 1990. *The competitive advantage of nations.* New York: Free Press.

Tosi, H. L., & Gomez-Mejia, L. R. 1989. The decoupling of CEO pay and performance: An agency perspective. *Administrative Science Quarterly,* 34: 169–189.

Walsh, J. P., & Seward, J. J. 1990. On the efficiency of internal and external corporate control mechanisms. *Academy of Management Review,* 15: 421–458.

Williamson, O. E. 1984. Corporate governance. *Yale Law Journal,* 93: 1197–1230.

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RESEARCH NOTES

CONSEQUENCES OF CORPORATE REFOCUSING: EX ANTE EVIDENCE

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During the 1980s, many diversified firms reduced their diversification by refocusing. This study examined whether this refocusing created market value for the companies involved. It is shown that refocusing announcements are associated with significant, positive abnormal returns, which implies that firm diversification levels prior to refocusing were higher than optimal.

During the 1980s, many diversified firms reduced their diversification by refocusing on their core businesses; several studies provide statistical evidence for this contention (Lichtenberg, 1990; Markides, 1990; Williams, Paez, & Sanders, 1988). My previous research, (Markides, 1990) identified these refocusing firms as having high diversification and poor profitability relative to their industry counterparts and suggested that the reason they refocused was that they had diversified beyond their optimal diversification limits. By refocusing on their core businesses, these firms are moving back, closer to their optimal diversification levels. This statement in turn implies that refocusing helps these firms improve their profitability and market value (cf. Hoskisson & Turk, 1990: 470). The reported research tested this prediction empirically. My purpose was to determine whether the market value of firms that refocus increases. I examined 45 firms using event-study methodology to assess the stock market reaction surrounding their refocusing announcements. In an efficient capital market, the effects of such announcements reflect the long-term consequences of refocusing. This effect may not prove to be accurate, but it will be unbiased—neither too high nor too low on the average. In this study, I expected the refocusing-announcement effect to be positive and statistically significant.

THEORETICAL CONSIDERATIONS

A Limit to Diversification

Intuitively, it would seem that in a world in which transaction costs are not assumed to be unimportant, there must be a limit to how much a firm can grow in size. For instance, managerial diseconomies of scale may lead to U-shaped average cost curves, which limit size (cf. Keren & Levhari, 1983). Were this not the case, the world would be dominated by a single megafirm.[1]

The issue of such a size limit has been the subject of several debates in economics (e.g., Calvo & Wellisz, 1978; Mueller, 1987: 26–29; Williamson, 1967). Depending on the specific assumptions they have used, various models have provided different answers. Here, I was only concerned with over-diversification as one limitation on the efficient size of a firm. The issue of a limit to firm diversification is formulated in terms of marginal benefits and marginal costs.

Previous research has found that diversification has certain benefits. For example, transaction cost economists (e.g., Caves, 1971; Montgomery & Wernerfelt, 1988; Teece, 1982) have emphasized the benefits that arise when a firm diversifies to exploit its excess firm-specific assets, such as brand names, managerial skills, consumer loyalty, and technological innovations. These assets cannot be traded in the market because of a variety of imperfections such as transaction costs of transferring and using the assets. Firms therefore diversify to exploit these assets in other markets.

Other benefits of diversification include the market-power advantages emphasized in the industrial organization literature (e.g., Berry, 1971; Gort, 1962; Markham, 1973; Rhoades, 1973); the tax benefits and other financial advantages emphasized in the finance literature (e.g., Galai & Masulis, 1976; Lewellen, 1971); the benefits associated with growth, emphasized in the strategy literature (e.g., Guth, 1980); and other miscellaneous benefits associated with reductions in agency problems (e.g., Aron, 1988).

In addition to citing these benefits, and perhaps more important, previous research has also suggested that the marginal benefits of diversification tend to decrease as firms diversify further and further away from their basic businesses. For example, Montgomery and Wernerfelt (1988) argued that a firm contemplating diversification will first try to apply its excess assets to the closest market it can enter. If excess capacity remains, the firm will enter markets even further afield. But as assets are applied in more and more distant fields, they lose their competitive advantage and thus earn lower profits. This implies that the relationship between diversification and its marginal benefits is a decreasing function.

Research has also identified certain costs of diversification. Penrose (1959), for example, emphasized the long-run constraints associated with

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[1] If no limit existed, it would have meant that infinite economies of scale exist. Such an outcome could theoretically emerge if zero transaction costs are assumed.

recruiting, training, and assimilating new managers as a firm grows. Williamson (1967) looked at the costs of diversification in terms of information processing. He argued that top management must gather information from the operating layers of a firm and send down directions based on the information gathered. Some of this information gets lost or distorted as it passes from one layer of a hierarchy to another. The loss of information and the inefficiencies that are created as a result constitute the costs of diversification.

Other costs emphasized in the relevant literature include the control and effort losses arising from increasing employee shirking as a firm diversifies (e.g., Calvo & Wellisz, 1978); coordination costs and intrinsic diseconomies of scale in the expansion of a firm's hierarchical structure (e.g., Keren & Levhari, 1983); inefficiencies created when managers continue to apply their existing "dominant logic" to newly acquired, strategically dissimilar businesses (e.g., Prahalad & Bettis, 1986); governance and control limits of internal capital markets that lead to inefficiencies (e.g., Hoskisson & Turk, 1990); and inefficiencies arising from executives' information-processing limits (e.g., Hoskisson & Hitt, 1988).

Many researchers have demonstrated that such costs exist in today's firms (e.g., Finkelstein, 1986; Kitching, 1967; Ravenscraft & Scherer, 1987). Others have specified the likely functional relationship between diversification and its marginal costs. As a firm diversifies, the costs of diversification increase, according to the cited arguments of Williamson (1967), Prahalad and Bettis (1986), and others. This discussion suggests that the relationship between diversification and its marginal costs is an increasing function.

A declining marginal benefit curve and a rising marginal cost curve imply a meeting point where costs equal benefits. This point will be the optimal limit to diversification for a particular firm. A firm that starts from zero diversification level can diversify profitably up to that point. After the firm reaches it, however, the costs of additional diversification outweigh the benefits, so it doesn't pay for the firm to diversify any more. Even though every firm has a different optimal point, dictated by its resources, the important issue to note is that every firm has a limit to how much it can diversify.

Why Overdiversify?

If a firm is profit maximizing, it should diversify up to its optimal diversification point and then stop. According to Montgomery and Wernerfelt (1988), that is what all firms do: they stop diversifying when the marginal benefits from an additional diversification move become subnormal. This implies that no firm should be in the region beyond its optimal point because no rational firm will go beyond that point. Yet, researchers have recently proposed at least two reasons why some firms may systematically overinvest in diversification.

First, agency theorists in general (e.g., Jensen & Meckling, 1976;

Williamson, 1964) and Jensen (1986) in particular have proposed that firms will invest in diversification projects whose net present value is less than zero when their managers pursue maximization of their own interests rather than shareholder-value maximization. The conditions for such behavior are ripe in firms in mature industries that generate more earnings than can be profitably reinvested (Mueller, 1972). As a result, managers can use these retained earnings to finance investments, without resorting to the limiting external capital market.

Second, it has been proposed that during the past 20 years, changes in the product and capital markets have reduced the inherent benefits of diversification while increasing its costs. For example, Bhide (1989) argued that the rising sophistication of the capital market resulting from deregulation and increased competition has eroded one of the major advantages of a diversified firm, that of acting as an internal capital market to its divisions (Williamson, 1975). Similarly, Hill and Hoskisson (1987), Mueller (1972), and Williams and colleagues (1988) have all argued that economic globalization and increased environmental uncertainty and volatility have increased some costs of diversification, such as the information and control loss problems associated with the steep hierarchies of diversified firms. These changes imply that the optimal diversification levels of firms are now lower, so that even firms that were optimally diversified 20 years ago are now overdiversified.

For these two reasons, therefore, it is likely that some firms are diversified beyond their optimal levels.[2] But if firms are overdiversified, either because they have overinvested in diversification or because their optimal levels of diversification are now lower, it follows that their profitability and market value must suffer. The big gap between the market value of many firms and their break-up value provides evidence that this is indeed the case (*Business Week*, 1985). Hence, the appropriate remedial action will be for these firms to reduce their diversification—to refocus.

This discussion suggests a testable hypothesis. If overdiversified firms can be identified ex ante, then:

> *Hypothesis 1: For overdiversified firms, reductions in diversification will lead to market value improvements.*

How much the market value of a firm will improve after refocusing will depend on a variety of factors, such as the magnitude and character of the refocusing action itself, the position the firm was in before deciding to restructure, any other restructuring that takes place within the firm after refo-

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[2] Other possible reasons firms have overinvested in diversification over the past 20 years include managerial hubris (Roll, 1986), wrong signals and incentives from the capital market (Jacoby, 1969; Morck, Shleifer, & Vishny, 1989), low marginal tax rates on long-term capital gains relative to tax rates on dividends and interest (Turk & Baysinger, 1989), and systematic divergence between the social and private cost-benefit analysis of diversification (Markides, 1990).

cusing, the industry the refocuser is returning to, and the refocuser's basic corporate strategy.[3] For example, through survey questionnaires used in previous research (Markides, 1990) I found that firms that refocused and changed their structure from an M-form to a CM-form[4] have outperformed firms that refocused but retained their M-form structure. Similarly, Jarrell and Comment (1989) found that the greater the extent of refocusing, the higher the subsequent returns to shareholders.

For the purposes of the present research, I made only a preliminary attempt to determine if a firm's diversification and profitability in the year prior to its refocusing affected market reaction. If the account of diversification presented above is valid, overdiversified firms should be characterized by poor profitability and market value. These are the firms that stand to benefit the most by refocusing. Therefore, the market should value the refocusing of firms characterized by high diversification and poor profitability higher, on average, than it values refocusing by other firms.

METHODS

Data

A search through the business press produced 870 announcements of restructuring in the 1980–88 period. I screened these announcements to isolate those involving refocusing. To be classified as a refocusing announcement, a story had to meet one of the following criteria: (1) The term "refocusing" or "concentrate on the core" appeared in the announcement: "Baton Broadcasting Inc. said it plans to get out of printing and packaging industry . . . to concentrate on its core broadcasting business" (*Wall Street Journal*, October 12, 1988: B6). (2) The author of a story evaluated the action reported as refocusing and described it as such: "Eli Lilly & Co, in an effort to focus its resources on its core pharmaceuticals business, put its Elizabeth Arden cosmetics unit on the block. . . ." (*Wall Street Journal*, April 3, 1987: 7). (3) The action announced amounted to a return to a firm's core business: "Ametek plans to spin off several of its divisions into a separate company, allowing it to concentrate on its precision-technology businesses" (*Wall Street Journal*, March 28, 1988: 4).

This screening process produced 81 refocusing announcements, a very conservative estimate of the number of such announcements in the original population because the screening criteria were very strict. I made the criteria strict to make sure that no value judgment was required to decide if an announcement concerned refocusing or not. I also wanted to make sure that I captured only the initial announcement of a firm's decision to embark on a refocusing program, not individual divestiture announcements following

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[3] I am grateful to an anonymous reviewer for suggesting these factors to me.

[4] Centralized multidivisional structure (CM-form) differs from M-form structure in that a CM-form company's head office gets involved in the operating decisions of the divisions.

this announcement of intent (cf. Schipper & Thompson, 1983). Thus, I am confident that all the announcements studied concerned true refocusing actions and were perceived by the market as such.

To be included in the final analyses, refocusing announcements had to meet the following additional criteria: (4) The date of the refocusing announcement could be identified in the *Wall Street Journal Index;* (5) no major confounding announcements (earnings, dividends, share repurchases) were made within five days before or after the announcement day; and (6) the refocusing firm's stock price returns were available on the Center for Research in Security Prices (CRSP) tapes.

In addition, I screened the *Wall Street Journal Index* for the three years prior to each announcement to make sure that the firm concerned had made no other refocusing announcements in those years. In all, these steps eliminated 36 announcements. The final data consist of 45 refocusing announcements.

Analysis

Standard event-study methodology was used to assess the impact of refocusing announcements on shareholder wealth (Brown & Warner, 1985). I calculated market model parameters for each firm over the period from 270 to 90 days prior to the refocusing announcement using daily company returns and equally weighted market returns from the CRSP tapes. I then used the market model to calculate excess returns over the two-day announcement period.

A two-day abnormal rate of return was necessary to capture the full impact of refocusing announcements. I defined day 0 as the day the *Wall Street Journal* published the news of refocusing. In many cases, however, the news was announced one day (day -1) and reported the next day. If a refocusing is announced before the market closes, the market's response actually predates the announcement by one day. If the news is announced after the market closes, it will respond on the next day, and the announcement day is indeed day 0. Thus, in reality, there is a two-day announcement period.

Having estimated the excess returns, I calculated a t-statistic for the mean two-day excess return as $t = CAR_{(-1,0)}/(s_{CAR(-1,0)}/\sqrt{N})$, where $CAR_{(-1,0)}$ equals the mean two-day cumulative abnormal rate of return —the sum of all two-day abnormal returns divided by the number of firms; $s_{CAR(-1,0)}$ equals the standard deviation of the two-day excess returns; and N equals the number of firms.

Who Are the Overdiversified Firms?

As noted earlier, the hypothesis of this study could only be tested after ex ante identification of the overdiversified firms in the study group. However, identifying every firm's optimal diversification level, although theoretically feasible, is practically impossible. Every firm has a different limit depending on its resources, external environment, type of diversification,

management team, capacity to learn from past diversification moves, and so forth. The optimal diversification limit for a particular firm is really a theoretical concept, much like the utility concept in economics, and cannot be measured precisely. To identify the overdiversified refocusers, I therefore needed to take an indirect route and use proxies. Six different strategies were used to classify firms into under- and overdiversified groups.

All refocusers. I assumed that any firm that decided to refocus must have done so for a good reason—that it perceived itself as overdiversified and suffering as a result. Therefore, I classified all 45 firms as overdiversified. This reasoning implies that the whole group should yield a positive abnormal return.

Total diversification index median. For each firm, I calculated an entropy index of total diversification (DT) and an entropy index of unrelated diversification (DU) in the manner demonstrated by Palepu (1985). The indexes were calculated for the year prior to the refocusing year, or for two years prior if only those data were available. Data came from the Trinet Historical Large Establishment tapes; because of missing information, the index could only be calculated for 33 of the refocusing firms.[5] I classified firms whose diversification index value was above the median for the group as overdiversified $(N = 17)$ and firms whose value was below the median as not overdiversified $(N = 16)$. The analysis was then repeated using the unrelated index of diversification. Since it's very likely that most, if not all, the firms refocused because they considered themselves overdiversified, this subdivision increased my chances of selecting the truly overdiversified firms.

Total diversification index quartiles. To improve even further the chances of correctly selecting the overdiversified firms, I subdivided the firms into quartiles according to DT. This further subdivision was done at the cost of smaller subgroups. The first quartile $(N = 8)$, containing the firms with the smallest diversification levels in the study, is designated the not overdiversified group. The fourth quartile $(N = 9)$ contains the firms with the highest diversification levels and is designated the overdiversified group.

Core industry median, total diversification index. Even though every firm has a different optimal diversification level, it is likely that within a given industry the optimal diversification levels for most firms lie within a narrow range. I therefore assumed that within each industry, the firms most likely to be overdiversified are those with diversification levels higher than their industry median. To carry out this classification, I first defined each firm's core industry as the two-digit Standard Industrial Classification (SIC) code in which the company had the largest percentage of its sales. This may be a crude measure, given the involvement of the firms studied in many

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[5] Although not perfect, this data base is superior to anything else publicly available (Hansen & Hill, 1991: 7).

industries, but it's the only practical alternative. Next, to estimate every industry's median diversification index, I selected a random sample of 250 *Fortune* 500 firms by drawing 50 firms at random from the 100 largest *Fortune* 500 firms, 50 from the next 100 largest, 50 from the next 100 largest, and so forth. For each firm I estimated its diversification level, *DT*, but because of information missing from the Trinet tapes, 40 firms were lost (spread evenly over the five *Fortune* groups). After sorting the remaining 210 firms by core industry and ranking them within industries by diversification level, I placed each of the 33 refocusing firms in its respective core industry and classified firms with diversification index values higher than their industry's median as overdiversified ($N = 21$); the rest were classified as not overdiversified ($N = 12$).[6]

Fortune sample median, total diversification index. The median diversification index value for the 210 *Fortune* 500 firms was 1.99. Since the *Fortune* 500 are presumably the most diversified firms in the U.S. economy, this number is probably on the high side of the diversification scale. I therefore used it as a reasonable cutoff point, classifying refocusing firms whose index was higher ($N = 20$) as overdiversified and classifying the rest ($N = 13$) as not overdiversified.[7]

Diversification and profitability medians. As argued in the theory section, poor profitability is likely to characterize overdiversified companies. I therefore classified as overdiversified firms whose diversification index values were higher than the group median and whose profitability was lower than that group's median ($N = 10$).[8] Profitability was measured as a firm's return on sales (ROS) minus industry-weighted ROS. To calculate the industry-weighted ROS, I first used a COMPUSTAT program to identify all the firms assigned to each two-digit SIC code and to calculate their ROS. Then, using their sales as weights, I estimated the average ROS of every two-digit group. Next, using a breakdown of each refocusing firm's sales by two-digit SIC code from the Trinet tapes, I calculated the percentage of the firm's sales in each code. The industry-weighted ROS for each firm was then estimated by multiplying the fraction of the firm's sales in each SIC code by the corresponding ROS of that code and adding the results. So adjusting each firm's ROS adjusts for the multiindustrial involvement of the studied firms and makes the ROS figures comparable across industries.

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[6] I chose the *Fortune* 500 list for this exercise for two reasons: First, most of the refocusing firms studied (88%) come from this group. The average value of the diversification index of the 33 firms is 2.15; it is 1.98 for the 210 *Fortune* 500 firms. The average size (1985 sales) of the 33 firms is $3.1 billion, versus $4.5 billion for the *Fortune* 500 firms. Second, the *Fortune* 500 list contains the most diversified firms in America. By using these firms to calculate industry median diversification levels, I increased the likelihood that the firms classified as overdiversified truly were so.

[7] Also, since most of the refocusing firms studied come from the *Fortune* 500, a convenient cutoff point can be the median diversification level of these firms.

[8] I also subdivided the firms according to core industry diversification and profitability and repeated the analysis on this subgroup of overdiversified firms ($N = 12$).

To doublecheck my results, I also used these criteria to reclassify the firms in terms of the index of unrelated diversification instead of the index of total diversification. I expected little difference in the results since the two indexes are highly collinear ($r = .85$).

RESULTS

Of the 45 two-day CARs calculated, 15 are negative and 30 are positive. They range in value from -12.7 percent to $+18.9$ percent. The average overall two-day CAR is $+1.73$ percent ($t = 2.03$, $p < .05$, two-tailed test). Thus, on average, refocusing creates shareholder value, a result consistent with the hypothesis of this study.

The majority of the abnormal returns fall within the narrow range from -10 to $+10$ percent. There is, however, one large positive outlier ($+18.8\%$) and a smaller negative outlier (-12.7%). To determine if the outliers drove results, I first dropped the positive outlier from the data; the CAR fell to 1.34 percent but remained statistically significant ($t = 1.73$). When both outliers were dropped, the CAR jumped to 1.67 percent and became highly significant ($t = 2.31$). For the rest of the analysis, I report results for all the firms and the subgroup excluding the two outliers.

The movement and levels of average and cumulative residuals before and after the announcement day (day 0) are consistent with those found in earlier research on divestitures (cf. Linn & Rozeff, 1985; Markides & Berg, 1988). The biggest abnormal return (1.61%) occurs on the day before announcement, a result consistent with the premise of an efficient capital market. From the tenth day before the refocusing announcement through the announcement day, the CARs total 3.39 percent ($p < .02$). For the ten days following the announcement, the abnormal returns appear random and cancel each other out, so that no real value change occurs during this period. Again, this pattern is consistent with the assumption of an efficient capital market, in that all new information is quickly incorporated in the stock prices of firms.

To test the robustness of the main finding that refocusing creates market value, I also calculated CARs for longer time windows. Table 1 shows some of these calculations. It is interesting to note that more than 75 percent of the total abnormal value is created in the relatively short period of the five days immediately before refocusing announcements. It is also important to note that from the announcement date to ten days afterward, no value is created. Again, these are results consistent with capital market efficiency. None of these basic findings change when the two outliers are removed.

As argued before, it is likely that the studied firms refocused because they perceived themselves as overdiversified. Therefore, one way of identifying overdiversified firms is to assume that all refocusers are overdiversified. The finding that the whole study group creates a positive significant CAR is consistent with this assumption. As described above, I used several other strategies to identify the overdiversified firms. Table 2 shows those

TABLE 1
Cumulative Abnormal Returns for Various Time Windows

Days	CAR	t
All firms[a]		
−10−+10	3.43	2.10*
−5− +5	2.28	2.09*
−3− +3	1.78	1.51
−2− +2	1.45	1.41
−1− 0	1.73	2.03*
−10− 0	3.39	2.36*
−5− 0	2.63	2.81**
−5− −1	2.51	3.06**
+1− +5	−0.35	−0.72
0−+10	0.15	0.17
Two outliers excluded		
−10−+10	2.71	1.67†
−5− +5	1.89	1.87†
−1− 0	1.67	2.31*
−10− 0	2.73	1.91†
−5− −1	2.16	2.69**
−5− 0	2.26	2.62**
0−+10	0.07	0.08
Positive outlier excluded		
−10−+10	3.08	1.89†
−5− +5	1.79	1.79†
−1− 0	1.34	1.73†
−10− 0	3.04	2.13*
−5− −1	2.22	2.82**
−5− 0	2.18	2.59**
0−+10	0.00	0.00

[a] $N = 45$.
† $p < .10$, two-tailed test
* $p < .05$, two-tailed test
** $p < .01$, two-tailed test

results. The main result to emerge from this sensitivity analysis is that no matter what classification strategy is used, the group of firms classified as overdiversified consistently create statistically significant abnormal returns, and the others do not. This result does not change when the two outliers are removed.

Of the six strategies used to identify overdiversified firms, the most likely to do so correctly is the last: the truly overdiversified firms should be characterized not only by high diversification but also by poor profitability. As Table 2 shows, those firms ($N = 10$) create the biggest CAR (4.91%) of all the groups, and this is highly significant. To doublecheck this result, I used the same criterion to identify the overdiversified firms but used the core industry median diversification index and profitability as cutoff points instead of the parallel figures from the full group. Again, the overdiversified group ($N = 12$) has a highly significant ($t = 3.25$) CAR (4.23%), while the not overdiversified group has an insignificant CAR.

TABLE 2
Abnormal Returns for Total Diversification Index Classifications

Classification Criteria	All Firms			Two Outliers Excluded		
	N	CAR, Day −1 to Day 0	t	N	CAR, Day −1 to Day 0	t
All refocusers	45	1.73	2.03*	43	1.67	2.31*
By median						
Not overdiversified	16	0.84	0.64	16	0.84	0.64
Overdiversified	17	3.64	2.28*	15	3.72	3.65**
By quartiles						
First	8	−2.41	−1.44	8	−2.41	−1.44
Second	8	4.09	3.38**	8	4.09	3.38**
Third	8	4.32	2.01†	7	2.25	2.14†
Fourth	9	3.03	1.31	8	5.00	3.26*
By core industry median						
Not overdiversified	12	0.79	0.37	11	−0.86	−0.58
Overdiversified	21	3.14	2.79*	20	3.94	4.61**
By *Fortune* sample median						
Not overdiversified	13	0.46	0.29	13	0.46	0.29
Overdiversified	20	3.47	2.55*	18	3.51	4.04**
By median diversification and profitability						
Not overdiversified	23	1.14	0.91	22	1.77	1.54
Overdiversified	10	4.91	2.81*	9	3.36	3.21**

† $p < .10$, two-tailed test
* $p < .05$, two-tailed test
** $p < .01$, two-tailed test

As a final exercise, I tested the sensitivity of these results by using the index of unrelated diversification instead of the total diversification index to classify firms. Table 3 shows some of these results. Again, the main result to emerge is that no matter what criterion is used, the firms classified as over-diversified consistently create significant, positive abnormal returns, but the not overdiversified firms create no value. This result remains unchanged when the outliers are removed from the data. All these results have to be approached with some hesitancy, given the small sizes of the different sub-groups.

SUMMARY AND DISCUSSION

Perhaps the most important contribution of this study is the finding that reductions in diversification are associated with value creation. This finding implies that there is a limit to how much a firm can diversify; if a firm goes beyond this limit, its market value will suffer; and some firms have indeed gone beyond their limits over the past two decades. Refocusing can be

TABLE 3
Abnormal Returns for Unrelated Diversification Index Classifications

Classification Criteria	All Firms			Two Outliers Excluded		
	N	CAR	t	N	CAR	t
By median						
Not overdiversified	16	0.10	0.09	16	0.10	0.09
Overdiversified	17	4.33	2.66*	15	4.51	4.13**
By quartiles						
First	8	−2.30	−1.34	8	−2.30	−1.34
Second	8	2.49	2.87*	8	2.49	2.87*
Third	8	4.42	2.62*	8	4.42	2.62*
Fourth	9	4.26	1.58	7	4.61	3.48**
By core industry median						
Not overdiversified	15	1.21	0.78	15	1.21	0.78
Overdiversified	18	3.18	2.21*	16	3.19	3.87**
By *Fortune* sample median						
Not overdiversified	7	−1.79	−0.96	7	−1.79	−0.96
Overdiversified	26	3.38	2.89**	24	3.41	3.98**

* $p < .05$, two-tailed test
** $p < .01$, two-tailed test

viewed as an adjustment process that brings overdiversified firms closer to their optimal limits and thus improves their efficiency (e.g., Shleifer & Vishny, 1990).

It is still unclear whether firms become overdiversified firms through non–profit-maximizing behavior by their managers (Jensen, 1986; Mueller, 1972) or through the lowering of optimal diversification levels by external changes. As Hoskisson and Hitt argued, more research is needed "to understand how resources and incentives interact to affect a firm's diversification strategy" (1990: 495). It is also not clear why overdiversified firms are refocusing now. Even though most academics seem to credit the market for corporate control for this activity (e.g., Bhagat, Schleifer, & Vishny, 1990; Jarrell, Brickley, & Netter, 1988), it is also possible that managers learn from past mistakes and restructure voluntarily (Donaldson, 1990).

A critical implication of this study is that the relationship between diversification and profitability is not linear, but curvilinear: at low levels of diversity, it is positive; but once a firm diversifies beyond its optimal diversification level, the relationship becomes negative. In their recent survey of the diversification literature, Hoskisson and Hitt (1990: 474) also pointed out the existence of a curvilinear relationship between performance and diversification.

It is important to note that even though this study did not explicitly address type of diversification (related versus unrelated), that distinction should not affect the basic results of the study. A firm primarily engaged in unrelated diversification faces steeper marginal benefit and cost curves than

a related diversifier, and the former will thus have a much lower optimal diversification level. But both firms still have limits, and both will suffer if they go past their limits. The same argument applies to firms that learn how to manage diversification as they go along: organizational learning affects the slope of their marginal benefit and cost curves but does not prevent them from having limits or from running into diseconomies once they pass those limits.

In addition, this study suggests that the prevailing popular belief that it is only conglomerates that are dediversifying is incorrect (e.g., Lichtenberg, 1990): along with the conglomerates, every overdiversified firm will be refocusing. Although the conglomerates are the most likely candidates to be overdiversified, there is no theoretical reason to believe that no other firm is overdiversified.

Future research efforts could try to explain the variation in the distribution of the abnormal returns found here. For example, the refocusing announcements of a few of the firms I classified as overdiversified created negative abnormal returns. My theory cannot explain this result. As Hoskisson and Hitt (1990) argued, to better understand the relationship between diversification and performance, scholars need to examine in more detail the fit between diversification strategy and organizational culture, managerial characteristics, and structural implementation.

REFERENCES

Aron, J. D. 1988. Ability, moral hazard, firm size, and diversification. *Rand Journal of Economics,* 19: 72–87.

Berry, C. H. 1971. Corporate growth and diversification. *Journal of Law and Economics,* 14: 371–383.

Bhagat, S., Shleifer, A., & Vishny, R. W. 1990. Hostile takeovers in the 1980s: The return to corporate specialization. In M. N. Baily & C. Winston (Eds.), *Brookings Papers on Economic Activity: Microeconomics 1990:* 1–84. Washington, DC: Brookings Institution.

Bhide, A. 1989. *The causes and consequences of hostile takeovers.* Unpublished doctoral dissertation, Harvard University Graduate School of Business Administration, Boston, MA.

Brown, S. J., & Warner, J. B. 1985. Using daily stock returns: The case of event studies. *Journal of Financial Economics,* 14: 3–31.

Business Week. 1985. Breakup value is Wall Street's new buzzword. July 8: 80–81.

Calvo, G. A., & Wellisz, S. 1978. Supervision, loss of control, and the optimum size of the firm. *Journal of Political Economy,* 86: 943–952.

Caves, R. E. 1971. International corporations: The industrial economics of foreign investment. *Economica,* 38: 1–28.

Donaldson, G. 1990. Voluntary restructuring: The case of General Mills. *Journal of Financial Economics,* 27: 117–141.

Finkelstein, S. 1986. The acquisition integration process. *Academy of Management Best Papers Proceedings:* 12–16.

Galai, D., & Masulis, R. 1976. The option pricing model and the risk factor of stock. *Journal of Financial Economics,* 3: 53–82.

Gort, M. 1962. *Diversification and integration in American industry.* Princeton, NJ: National Bureau of Economic Research.

Guth, W. D. 1980. Corporate growth strategies. *Journal of Business Strategy,* 1(2): 56–62.

Hansen, G. S., & Hill, C. W. L. 1991. Are institutional investors myopic? A time-series study of four technology-driven industries. *Strategic Management Journal,* 12: 1–16.

Hill, C. W. L., & Hoskisson, R. E. 1987. Strategy and structure in the multiproduct firm. *Academy of Management Review,* 12: 331–341.

Hoskisson, R. E., & Hitt, M. A. 1988. Strategic control systems and relative R&D investment in large multiproduct firms. *Strategic Management Journal,* 9: 605–621.

Hoskisson, R. E., & Hitt, M. A. 1990. Antecedents and performance outcomes of diversification: A review and critique of theoretical perspectives. *Journal of Management,* 16: 461–509.

Hoskisson, R. E., & Turk, T. A. 1990. Corporate restructuring: Governance and control limits of the internal capital market. *Academy of Management Review,* 15: 459–477.

Jacoby, N. 1969. The conglomerate corporation. *Center Magazine,* 2(4): 7–14.

Jarrell, G. A., Brickley, J. A., & Netter, J. M. 1988. The market for corporate control: The empirical evidence since 1980. *Journal of Economic Perspectives,* 2(1): 49–68.

Jarrell, G. A., & Comment, R. 1989. Going back to basics seems to be a smart move. *Business Week,* November 20: 22.

Jensen, M. C. 1986. Agency costs of free cash flow, corporate finance, and takeovers. *American Economic Review,* Papers and Proceedings of the 98th Annual Meeting of the American Economic Association, 76: 323–329.

Jensen, M. C., & Meckling, W. H. 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics,* 3: 305–360.

Keren M., & Levhari, D. 1983. The internal organization of the firm and the shape of average costs. *Bell Journal of Economics,* 14: 474–486.

Kitching, J. 1967. Why do mergers miscarry? *Harvard Business Review,* 45(6): 84–101.

Lewellen, W. 1971. A pure financial rationale for the conglomerate merger. *Journal of Finance,* 26: 521–537.

Lichtenberg, F. R. 1990. Want more productivity? Kill that conglomerate. *Wall Street Journal,* January 16: A16.

Linn, S. C., & Rozeff, M. S. 1985. The effect of voluntary spin-offs on stock prices: The anergy hypothesis. *Advances in Financial Planning and Forecasting,* 1: 265–291.

Markham, J. W. 1973. *Conglomerate enterprise and public policy.* Boston: Harvard University Graduate School of Business Administration.

Markides, C. C. 1990. *Corporate refocusing and economic performance, 1981–1987.* Unpublished doctoral dissertation, Harvard University Graduate School of Business Administration, Boston.

Markides, C. C., & Berg, N. A. 1988. *Corporate divestitures: Survey of the literature and future research directions for business policy.* Working paper no. 89-011, Harvard University Graduate School of Business Administration, Boston.

Montgomery, C. A., & Wernerfelt, B. 1988. Diversification, Ricardian rents, and Tobin's Q. *Rand Journal of Economics,* 19: 623–632.

Morck, R., Schleifer, A., & Vishny, R. W. 1989. *Do managerial objectives drive bad acquisitions?* Unpublished manuscript, University of Chicago.

Mueller, D. C. 1972. A life cycle theory of the firm. *Journal of Industrial Economics,* 20: 199–219.

Mueller, D. C. 1987. *The corporation: Growth, diversification and mergers.* London: Harwood Academic Publishers.

Palepu, K. 1985. Diversification strategy, profit performance, and the entropy measure. *Strategic Management Journal,* 6: 239–255.

Penrose, E. 1959. *The theory of the growth of the firm.* Oxford, England: Blackwell.

Prahalad, C. K., & Bettis, R. A. 1986. The dominant logic: A new linkage between diversity and performance. *Strategic Management Journal,* 7: 485–501.

Ravenscraft, D. J., & Scherer, F. M. 1987. *Mergers, sell-offs and economic efficiency.* Washington, DC: Brookings Institution.

Rhoades, S. A. 1973. The effect of diversification on industry profit performance in 241 manufacturing industries: 1963. *Review of Economics and Statistics,* 55: 146–155.

Roll, R. 1986. The hubris hypothesis of corporate takeovers. *Journal of Business,* 59: 197–216.

Schipper, K., & Thompson, R. 1983. Evidence on the capitalized value of merger activity for acquiring firms. *Journal of Financial Economics,* 11: 85–119.

Shleifer, A., & Vishny, R. W. 1990. The takeover wave of the 1980s. *Science,* 249: 745–749.

Teece, D. J. 1982. Towards an economic theory of the multiproduct firm. *Journal of Economic Behavior and Organization,* 3: 39–63.

Turk, T. A., & Baysinger, B. 1989. *The impact of public policy on corporate strategy: Taxes, antitrust policy and diversification clienteles.* Working paper, Texas A&M University, Department of Management, College Station, TX.

Williams, J. R., Paez, B. L., & Sanders, L. 1988. Conglomerates revisited. *Strategic Management Journal,* 9: 403–414.

Williamson, O. E. 1964. *The economics of discretionary behavior: Managerial objectives in a theory of the firm.* Englewood Cliffs, NJ: Prentice-Hall.

Williamson, O. E. 1967. Hierarchical control and optimum firm size. *Journal of Political Economy,* 75: 123–138.

Williamson, O. E. 1975. *Markets and hierarchies: Analysis and antitrust implications.* New York: Free Press.

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LAYOFFS, JOB INSECURITY, AND SURVIVORS' WORK EFFORT: EVIDENCE OF AN INVERTED-U RELATIONSHIP

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The field study reported here explored the relationship between the job insecurity associated with a layoff and the work effort of employees who survived it. The relationship took the form of an inverted U, particularly among survivors whose economic need to work was relatively high. Theoretical implications are discussed, as are the limitations of the study and suggestions for future research.

Recent theory and research on layoffs have sought to identity the factors that influence the work behaviors and attitudes of those not laid off, the layoff survivors (Brockner, Grover, Reed, DeWitt, & O'Malley, 1987). Previous research investigating this question has focused on the effects of perceived fairness as key determinants of survivors' reactions. In an attempt to provide a more complete explanation of the determinants of survivors' reactions, the present study used a somewhat different theoretical underpinning, one emphasizing survivors' perceptions of their job insecurity.

Greenhalgh and Rosenblatt (1984) suggested that the level of job insecurity survivors experience depends on: (1) perceived threat, which is affected by such issues as the estimated likelihood of job loss, and (2) perceived control, which is influenced by survivors' belief that they or their employer can take some action to help them counteract the negative consequences of job loss. According to this two-component model of job insecurity, survivors' level of job insecurity should be: (1) highest when perceived threat is high and perceived control is low, (2) lowest when perceived threat is low and perceived control is high, and (3) moderate when both threat and control are high or both threat and control are low.

The central dependent variable in the present study—change in the work effort survivors make, relative to the prelayoff period—was chosen for several reasons. First, survivors' level of effort is one of the key determinants of their job performance; the other is ability. It seems unlikely that ability

levels will change appreciably after a layoff. Therefore, any change in survivors' work performance can most likely be attributed to change in work effort. Second, the choice of work effort as the dependent variable supports investigation of a somewhat nonintuitive prediction: that job insecurity will be related to the dependent variable in a nonlinear fashion. This prediction runs counter to the belief that job insecurity invariably has negative effects on employees' work attitudes and behaviors.

Several theoretical perspectives suggest that the relationship between layoff-induced job insecurity and survivors' work effort is probably not linear—specifically, that work effort will be greater at moderate rather than low or high levels of job insecurity. If job insecurity is low, survivors are likely to be unmotivated because they feel complacent. They do not believe that additional layoffs are likely: perceived threat is low. Moreover, even if additional layoffs occur, they believe that they or the organization can take action to help them avoid or minimize the negative consequences of job loss: perceived control is high. If job insecurity is high, survivors are also likely to be unmotivated, but for different reasons than if job insecurity were low. They believe that additional layoffs are likely (perceived threat is high). Furthermore, they believe that there is little that they or the organization can do to help them counteract the negative consequences of job loss (perceived control is low). These perceptions are likely to lead to feelings of helplessness, which, in turn, attentuate motivation (Seligman, 1975). Thus, moderate levels of job insecurity—high enough to overcome the complacency associated with low job insecurity, but not so high as to elicit the helplessness associated with high job insecurity—should lead survivors to exhibit the greatest level of work effort. If perceived threat and control are both high, survivors should feel neither complacent nor helpless, and thus should work relatively hard.[1]

The measure of job insecurity in the present study assessed both perceived threat and perceived control. If the job insecurity associated with a layoff is related to survivors' work effort in a nonlinear, inverted-U fashion, we expected to observe an effect for the interaction of perceived threat and perceived control: survivors' work effort should be greater when both elements are high or low (job insecurity is at a moderate level) than when either perceived threat is high and perceived control is low (job insecurity is high) or perceived threat is low and perceived control is high (job insecurity is low).

Another central purpose of the study was to examine whether survivors'

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[1] Our prediction is also consistent with several related motivational theories. For example, achievement motivation theory (e.g., Atkinson, 1964) suggests that work effort should be greatest at moderate rather than low or high levels of perceived task difficulty. In addition, activation level theory (e.g., Yerkes & Dodson, 1908) posits that individuals' arousal level is related to their work motivation and performance in an inverted-U fashion. These theories are relevant to the present study if it can be assumed that survivors' job insecurity is a proxy for perceived task difficulty or level of arousal.

economic need to work moderated the predicted inverted-U relationship between job insecurity and work effort. Theory and research on the relationship between beliefs and behavior contain the proposition that people's behavior is consistent with their beliefs to the extent that the beliefs are of psychological significance to them (Sivacek & Crano, 1982). It therefore stands to reason that survivors' job insecurity will be expressed in their work effort to the extent that their jobs are important or meaningful to them.

One determinant of the amount of importance individuals attach to their jobs is their economic need to work (Brief & Aldag, 1989). Survivors who are major breadwinners in their households are likely to be greatly influenced by their level of job insecurity, whereas those who are not major breadwinners are less likely to translate their feelings of job insecurity into their work effort. If this reasoning is correct, survivors' economic need to work should moderate the relationship between layoff-associated job insecurity and work effort. Whereas survivors generally should show an inverted-U relationship between job insecurity and work effort, the relationship should be more pronounced for those whose economic need to work is relatively high. That is, a triple interaction—perceived threat by perceived control by economic need to work—should emerge on the measure of survivors' work effort.

METHODS

Overview

Questionnaires were sent to employees in a chain of small retail stores throughout the United States. Since many stores in the chain had been recently closed, all employees in the stores that remained open could be considered survivors of a layoff. The questionnaire assessed all independent and dependent variables.

Sample

Organization. Respondents were employees of a national chain of 773 retail stores owned by a single company. In the 12 months prior to data collection, the company had closed many of its stores. Stores employed from 2 to 11 employees ($\bar{x}$ = 5.8, s.d. = 1.47).

Respondents. The 597 respondents were predominantly women (91%), white (83.5%), and married (70%). Their average age was 37.06 years (s.d. = 8.59). They were either sales clerks (74%) or store managers and had a mean tenure of 4.13 years (s.d. = 2.3) with the company.

Procedures

We randomly selected 300 stores from the store population for inclusion in the study. To ensure anonymity, we asked respondents not to write their names anywhere on the survey and instructed them to return their completed surveys directly to the principal researcher, not to their superiors in the organization. Of the 1,602 surveys distributed, 597 were returned within six weeks for an overall response rate of 37.3 percent. Not all respondents

completed all measures; hence, the number of observations for each measure was lower than the size of the entire sample.[2]

Independent Variables

Job insecurity. Several questions were designed to tap the two components of job insecurity. To assess perceived threat, we asked: "To what extent do you believe more layoffs in the organization are likely to occur in the near future?" Responses could range from "not at all likely" (1) to "very likely" (7).

To prime respondents for the measurement of the perceived control component, we first asked a series of questions about how well the organization had provided for the layoff victims in the form of, for instance, severance pay and outplacement counseling. Then they were asked the key question for perceived control: "Suppose you were to be laid off. If so, how well do you think the assistance that management actually offered the laid-off people would provide for your needs?" (not at all, 1, and very much, 7). Presumably, survivors who assigned low values in response to this question were unlikely to feel that the company would take some action to help them counteract the negative effects of job loss, and therefore their job insecurity was greater than that of other respondents.

Economic need to work. We asked, "To what extent are you the major breadwinner in your home?" (not at all, 1, and a great deal, 7).

Control Variables

Previous theory and research have identified several control variables significantly related to survivors' reactions (Brockner et al., 1987). Some of these earlier findings emerged from the same data base used for the present study. Therefore, it was especially important to evaluate whether the predicted effects associated with job insecurity added explanatory power beyond that offered by the control variables.

Perceived distributive fairness. Survivors who believe that the outcomes associated with the layoff are unfair are more likely to react adversely to the layoff. For example, the less survivors believe an organization offered concrete benefits to a layoff's victims, the more likely they are to perceive the layoff as distributively unfair. Four items measured distributive fairness. An example is: "The severance pay that the organization offered to the laid-off

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[2] The organization provided us with some demographic information about the entire employee population (N = 3,463) from which our sample was drawn. Within the population, 86 percent were women, and 74 percent were white. Their average age was 36.4 years. They were either sales clerks (80%) or store managers (20%). These figures are comparable to those for our respondents, suggesting that our sample was at least somewhat representative of the population to which we wish to generalize the results.

people was a generous amount" (strongly disagree, 1, and strongly agree, 7; α = .80).

Perceived procedural fairness. Survivors who believe the procedures used to implement a layoff were unfair are likely to react unfavorably to it. Three items measured procedural fairness; an example is: "How clearly were the reasons for the layoff explained to you by your supervisor?" (not at all clearly, 1, and very clearly, 7; α = .76).

Prior attachment to layoff victims. Previous research has shown that survivors react more negatively to layoffs perceived to be unfair when they felt close, or psychologically attached, to the layoff victims (Brockner et al., 1987). Two items measured survivors' prior attachment to the layoff victims; one was "How close of a professional relationship did you have with at least some of the layoff victims?" (not at all close, 1, and very close, 7; α = .88).

Perceived job enrichment. Hackman and Oldham (1980) showed that work motivation is positively related to the extent to which employees believe that their job is intrinsically interesting or enjoyable. We drew five items verbatim from Hackman and Oldham to measure perceived job enrichment; an example is: "I have considerable autonomy in my job; that is, I am allowed to decide on my own how to go about doing the work." To assess the extent to which survivors' reactions had changed since the layoff, the endpoints were "applied to me more *before* the layoff than now" (1) and "applies to me more *now* than before the layoff" (11). The middle point of the scale was "applies to me the *same*" (6). Coefficient alpha for this scale was .72.

Dependent Variables

Work effort. Respondents were asked to report change in the degree to which each item applied to them since the layoff. Specifically, we instructed them to indicate their opinion "now in comparison to how you felt one month prior to first hearing that there would be layoffs." The response scale was the same as for job enrichment. The dependent variable consisted of a three-item index including such statements as "I try to work as hard as possible" and "I intentionally expend a great deal of effort in carrying out my job" (α = .87).

Worry. We included a secondary dependent variable measuring survivors' level of worry relative to the prelayoff period. Presumably, high levels of job insecurity (high perceived threat and low perceived control) should be associated with increases in worry. Respondents indicated the extent to which they felt more or less "worried," "nervous," and "distressed" than before the layoff. The response format was the same as for job enrichment (α = .91).

Measurement of the dependent variables through retrospective self-reports of how survivors had changed since the layoff raises construct validity questions; for any of a number of reasons, respondents may have been unwilling or unable to accurately describe the change in their work effort or

level of worry. Although it is impossible to discount this possibility entirely, several findings suggest that the dependent variables were at least somewhat valid. Related studies using the same dependent variable format employed in the present study have produced replicable results with the use of more internally valid research designs. For example, Brockner and colleagues (1987) found similar results in a field study using the present retrospective dependent variable format and a laboratory experiment in which a conceptually analogous dependent variable was assessed in a tightly controlled fashion. More recently, a follow-up study (Brockner, Tyler, & Cooper-Schneider, 1992) found that the reactions of survivors captured by this retrospective format were conceptually replicated when individuals' reactions were assessed both before and after the key event. In short, related research without the retrospective dependent variable format has had results similar to those obtained with that format. One implication of that similarity is that the retrospective dependent variable format is at least somewhat valid.

RESULTS

Table 1 gives summary statistics for and correlations between the variables.

Our major predictions were (1) job insecurity should relate to change in work effort in an inverted-U fashion, which should manifest itself as a two-way interaction between perceived threat and perceived control, and (2) the inverted-U relationship between job insecurity and work effort should be more pronounced among survivors with relatively high economic need to work. This relationship should be manifested in a three-way interaction between perceived threat, perceived control, and economic need to work.

A hierarchical multiple regression analysis was used to test these hypotheses. In the first step, we simultaneously entered the main effects of perceived threat, perceived control, economic need to work, and each of the control variables. As shown in Table 2, under step 1, the only significant finding was a positive effect of perceived job enrichment. Those who felt that their job had become more intrinsically interesting reported a greater increase in work effort than those who did not perceive an increase in intrinsic interest.

In the second step, we added the interaction of perceived threat and perceived control and the interactions of economic need to work with perceived threat and perceived control. As predicted, the perceived-threat-by-perceived-control interaction was significant ($p < .05$). To help specify the interaction, we performed midscale splits on perceived threat and perceived control and computed the mean levels of work effort for each of the four groups. The results of this analysis confirmed predictions. Work effort was greater at moderate levels of job insecurity—when perceived threat and perceived control both were high ($\bar{x} = 21.85$) or low ($\bar{x} = 22.51$)—than it was at a high level of job insecurity (in which perceived threat was high and

TABLE 1
Summary Statistics and Correlations

Variables	Means	s.d.	Possible Range	1	2	3	4	5	6	7	8
1. Perceived threat	6.21	1.29	1–7								
2. Perceived control	2.89	1.76	1–7	-.18**							
3. Economic need to work	4.73	1.96	1–7	.08	.04						
4. Procedural fairness	3.53	1.63	1–7	-.09*	.30**	.02					
5. Distributive fairness	3.24	1.42	1–7	-.09*	.66**	.00	.41**				
6. Job enrichment	6.56	1.49	1–11	-.05	.14**	.08	.19**	.08			
7. Prior attachment	4.22	2.27	1–7	.09*	-.02	.08	-.08	.00	-.01		
8. Work effort	20.30	5.77	3–33	-.09*	.10*	.06	.14**	.10*	.46**	-.04	
9. Worry	22.88	7.65	3–33	.29**	.26**	.17**	-.20**	-.21**	-.02	.13**	-.07

* p < .05
** p < .01

TABLE 2
Results of Hierarchical Regression Analysis

Variables	b	s.e.	t	p
Step 1				
Economic need to work	0.06	0.14	0.41	.68
Perceived threat	−0.20	0.21	0.96	.33
Perceived control	−0.05	0.20	0.28	.78
Procedural fairness	0.07	0.18	0.42	.68
Distributive fairness	0.08	0.06	1.31	.19
Job enrichment	0.36	0.04	9.92	.01
Prior attachment	−0.05	0.06	0.88	.38
Intercept	9.16			
Overall $F_{7,394}$	16.56			.01
Total R^2	.23			
Step 2				
Economic need to work				
× perceived threat	−0.11	0.10	1.09	.27
Economic need to work				
× perceived control	0.10	0.07	1.41	.15
Perceived threat × perceived				
control	0.23	0.12	1.95	.05
Intercept	12.68			
Overall $F_{10,391}$	12.36			.01
Total R^2	.24			
$\Delta F_{3,391}$	2.20			.08
Step 3				
Economic need to work				
× perceived threat				
× perceived control	0.12	0.05	2.35	.02
Intercept	2.49			
Overall $F_{11,390}$	11.87			.01
Total R^2	.25			
$\Delta F_{1,391}$	5.52			.02

perceived control was low; $\overline{x} = 19.72$) or at a low level of job insecurity (in which perceived threat was low and perceived control was high; $\overline{x} = 19.23$).

To determine whether survivors' economic need to work moderated the interaction of perceived threat and perceived control, we added a third step to the regression procedure. The triple interaction of perceived threat by perceived control by economic need to work was added to all terms entered in the first two steps. As shown in Table 2, step 3, this triple interaction was significant ($p < .02$). We again performed midscale splits on all three independent variables and computed the mean level of work effort for the resulting eight groups. Table 3 presents results. As predicted, for those with high economic need to work, there was a sharp inverted-U relationship between job insecurity and work effort. At moderate levels of job insecurity, when perceived threat and perceived control were both high ($\overline{x} = 23.25$) or both low ($\overline{x} = 24.94$), survivors' work effort was considerably greater than

TABLE 3
Mean Work Effort as a Function of Midscale Splits[a]

| | Perceived Control | | | |
| | Low | | High | |
Variables	Means	s.d.	Means	s.d.
Economic need to work				
Low				
Perceived threat				
Low	20.83	6.15	20.57	4.76
High	19.55	5.19	20.29	4.50
High				
Perceived threat				
Low	24.94	6.25	18.70	4.76
High	19.93	6.12	23.25	5.82

[a] Values could range from 3 through 33. High scores reflect an increase in work effort relative to the prelayoff period.

when job insecurity was (1) high (high threat, low control; $\bar{x} = 19.93$) or (2) low (low threat, high control; $\bar{x} = 18.70$). However, for those with low economic need to work, there was virtually no relationship between job insecurity and work effort (see Table 3).[3]

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[3] Midscale rather than median splits were used to illustrate the form of the double and triple interactions. As the means imply (Table 1), the frequency distributions of perceived threat and perceived control were quite skewed; most respondents saw threat as high and control as low. Therefore, median splits would have provided a very conservative demonstration of the form of the interactions. Nevertheless, when we reclassified responses on the basis of median splits, the results took the same form as those already presented. Work effort was greater in the low threat–low control and high threat–high control conditions than in the low threat–high control and high threat–low control conditions; moreover, as in the pattern shown in Table 3, these tendencies were more pronounced among those with high economic need to work.

Respondents also completed a single-item measure of alternative job possibilities: "How much difficulty do you believe the laid off people will have in finding comparable work in another organization or occupation?" (very little difficulty, 1, and a great deal of difficulty, 7). Survivors generally were not optimistic about the ease with which those laid off could find comparable jobs; the average rating on this measure was 5.18. Moreover, when we repeated the regression analyses (Table 2) including this item as a control variable, the results did not differ from those already reported.

A multiple regression analysis was also performed on survivors' level of worry. Entered simultaneously were perceived threat, perceived control, economic need to work, and the four control variables. The overall $F_{7,388}$ was significant at the .001 level (total $R^2 = .19$). Perceived threat ($p < .001$), perceived control ($p < .01$), and economic need to work ($p < .01$) were significantly related to level of worry. As expected, high perceived threat and economic need to work and low perceived control were associated with high increases in survivors' level of worry. The only control variable to attain significance was procedural fairness ($p < .02$), which was inversely related to worry. All the two- and three-way interactions involving perceived threat, perceived control, and economic need to work were insignificant on the worry measure.

DISCUSSION

The set of results supported the predictions. First, moderate levels of job insecurity associated with a layoff stemming from either high perceived threat coupled with high perceived control or low threat combined with low control led to a greater increase in work effort than did low job insecurity (low threat and high control) or high job insecurity (high threat and low control). Second, survivors' economic need to work moderated these effects. Only those high in this need translated their feelings of job insecurity into their level of work effort, in the predicted inverted-U fashion.

Alternative Interpretations

The methodology of the present study lends itself to several alternative explanations of the obtained relationship between job insecurity and work effort. We measured the independent and dependent variables on the same questionnaire, a procedure that raises the possibility of problems associated with common method variance. Although this problem cannot be discounted entirely, the nature of the results argues against it. Specifically, the key findings in this study were interaction effects, such as the significance of the interaction of perceived threat, perceived control, and economic need to work. Cook and Campbell (1979) suggested that certain patterns of results are more susceptible to alternative interpretations than others, and interaction effects are usually less likely to be artifacts of common method variance than are main effects. Here, we always measured the independent and dependent variables via self-reports. However, the relationships between the variables were more pronounced under some conditions than under others. Said differently, the validity threat posed by common method variance was a constant in this study, but the results showed a theoretically derived, stronger association between job insecurity and work effort under some conditions than under others, thereby casting doubt on this validity threat. Nevertheless, an important question for future research is to establish whether similar results would emerge if the variables were not measured with a common method.

The construct validity of the independent variables certainly can be questioned. We measured perceived threat, perceived control, and economic need to work with single items of unknown reliability, let alone validity. However, when the results are considered as a whole, they suggest that the independent variables were at least somewhat valid. As predicted, job insecurity was related to: (1) work effort, in an inverted-U fashion, especially among those with high economic need to work, and (2) the experience of worry, in a linear fashion. The three independent variables were related to the dependent variables in different ways, some interactively and some additively, providing evidence that the operational definitions of the independent and dependent variables had some validity. Nevertheless, future research needs to address job insecurity more comprehensively. For example, issues other than survivors' beliefs about whether their organization will

provide for them in the case of layoffs are likely to affect their perceived control.[4] The significant interaction effects accounted for relatively small portions of the variance (Table 2, steps 2 and 3). If job insecurity could be assessed with even greater reliability and validity than in the present study, future researchers might be able to explain even more of the variability in survivors' reactions.[5]

As mentioned previously, the dependent variables are of questionable construct validity. In addition to evidence in support of the measures' validity presented earlier, the present results suggest that the dependent variables were at least somewhat valid. From Table 2, step 1, it can be seen that perceived job enrichment, a control variable, was related to survivors' work effort. Given the extensive evidence suggesting that job enrichment and work motivation are related (Hackman & Oldham, 1980), the emergence of similar results in the present study provides additional suggestive evidence for the validity of the work effort measure.

Having said all this, we clearly recognize the potential for some invalidity with the use of retrospective self-reports on the dependent variables in the present study. An important methodological advance in future studies of survivors' reactions would be to assess survivors' work attitudes and behaviors both before and after a layoff; in that way, researchers could assess actual reactions to the layoff.

Theoretical Implications

Previous research on the survivors of layoffs has focused mainly on the role that their perceptions of fairness play in determining their reactions to the downsizing process (Brockner et al., 1987). The present study took as its starting point the hypothesis that the level of job insecurity they experience is also likely to affect survivors' reactions. Results of the reported regression analyses (Table 2) suggest that, with perceived fairness controlled, the job insecurity associated with a layoff influences survivors' work effort in an inverted-U fashion, especially among those with high economic need to work.

Furthermore, the present theory and empirical evidence attest to the complexity of the relationship between layoff-produced insecurity and survivors' reactions. Although there are theoretical reasons to believe that job

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[4] Ashford, Lee, and Bobko (1989) contains a promising new measure of job insecurity.

[5] Taken together, perceived threat by perceived control and the triple interaction accounted for 2 percent of the variance in work effort. This effect size seems small; however, tests for interaction effects in the moderated regression procedure are notoriously conservative because of multicollinearity. An interaction effect is by definition highly correlated with its main effect components. Thus, it is quite common to find small effect sizes for interaction terms derived from hierarchical regression. According to D. McFarlin (1991, personal communication), only 11 articles published in the *Journal of Applied Psychology* in 1989 yielded significant interaction effects using such analyses, and the amount of explained variance was generally rather small, averaging approximately 2 percent. Viewed in relation to these standards, the present results are not very unusual.

insecurity and work effort are related in an inverted-U fashion, there have been relatively few tests of this hypothesis in organizational settings. Researchers' failure to consider the curvilinear relationship may have led to confusing and seemingly inconsistent results across studies. For example, Greenhalgh and Rosenblatt (1984) reported that whereas job insecurity is typically positively associated with intention to quit and resistance to change, "investigations involving work effort have shown mixed results" (1984: 443). The results of the present study may help clarify such mixed results. If the heightening of employees' insecurity moves it from a moderate to a high range, their work effort should decrease. However, as insecurity increases from a low to a moderate range, employees' work effort may well increase rather than decrease.

The present findings also extend previous research investigating the conditions under which individuals' beliefs will be related to their behaviors. Attitude theory and empirical research (e.g., Sivacek & Crano, 1982) have shown that people are more likely to act on attitudes that are of importance to them. Conceptually analogous results emerged in this study: individuals whose jobs were financially important to them were more likely to exhibit a relationship between their level of job insecurity and their work effort than were their counterparts who attached less financial importance to their jobs (cf. George & Brief, 1990).

Future Research

The present study not only calls attention to the inverted-U relationship between job insecurity and work effort, but also to some issues that might moderate that relationship, such as survivors' economic need to work. Future research needs to explore additional boundary conditions for the inverted-U relationship between layoff-produced job insecurity and survivors' effort. The identification of boundary conditions should help to explain that relationship. As we stated in the introduction to this article and in its first footnote, it is possible to explain such a relationship through cognitive or arousal-based theories of motivation. The present study was not designed to be a critical test of those competing theories; however, future research needs to explain more precisely why job insecurity and work effort are related in an inverted-U fashion.

REFERENCES

Ashford, S. J., Lee, C., & Bobko, P. 1989. Content, causes, and consequences of job insecurity: A theory-based measure and substantive test. *Academy of Management Journal,* 32: 803–824.

Atkinson, J. W. 1964. *An introduction to motivation.* Princeton, NJ: Van Nostrand.

Brief, A. P., & Aldag, R. J. 1989. The economic functions of work. In K. Rowland & G. Ferris (Eds.), *Research in personnel and human resource management,* vol. 7: 1–23. Greenwich, CT: JAI Press.

Brockner, J., Grover, S., Reed, T., DeWitt, R., & O'Malley, M. 1987. Survivors' reactions to layoffs: We get by with a little help for our friends. *Administrative Science Quarterly,* 32: 526–542.

Brockner, J., Tyler, T. R., & Cooper-Schneider, R. 1992. *The influence of prior commitment to an institution on reactions to procedural injustice.* Manuscript under editorial review.

Cook, T. D., & Campbell, D. T. 1979. *Quasi-experimentation:* Boston: Houghton-Mifflin.

George, J. M., & Brief, A. P. 1990. The economic instrumentality of work: An examination of the moderating effects of financial requirements and sex on the pay–life satisfaction relationship. *Journal of Vocational Behavior,* 37: 357–368.

Greenhalgh, L., & Rosenblatt, Z. 1984. Job insecurity: Toward conceptual clarity. *Academy of Management Review,* 9: 438–448.

Hackman, J. R., & Oldham, G. R. 1980. **Work redesign.** Reading, MA: Addison-Wesley.

Seligman, M. E. P. 1975. *Helplessness.* San Francisco: Freeman.

Sivacek, J., & Crano, W. D. 1982. Vested interest as a moderator of attitude-behavior consistency. *Journal of Personality and Social Psychology,* 43: 210–221.

Yerkes, R. M., & Dodson, J. D. 1908. The relation of strength of stimulus to rapidity of habit formation. *Journal of Comparative Neurological Psychology,* 18: 459–482.

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EFFECTS OF FORMAL AUTHORITY AND EXPERIENCE ON THIRD-PARTY ROLES, OUTCOMES, AND PERCEPTIONS OF FAIRNESS

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Using a simulated organizational dispute, we contrasted the behavior of intervening third parties who had formal authority over the disputants to that of third parties who had no authority over them and examined the effect on third-party behavior of actual supervisory experience. The study also tested the relationships among third-party behavior, the outcome of the dispute and disputants' perceptions of fairness. Subjects were M.B.A. candidates and executive program participants; 99 percent had full-time work experience and 30 percent had more than five years of supervisory experience. Both the manipulated role and actual supervisory experience affected third-party behavior, which in turn affected outcome and fairness judgments.

Managers spend considerable time and resources resolving organizational disputes (Mintzberg, 1975). Research has shown that when managers become involved in disputes between peers or subordinates, they use a variety of third-party role behaviors (Karambayya & Brett, 1989; Kolb, 1986; Sheppard, 1983, 1984), and these role behaviors have implications for both the outcomes of the disputes and disputants' judgments of fairness (Karambayya & Brett, 1989). This study investigated two issues that may influence managers' third-party dispute resolution behaviors: level of authority vis-à-vis the disputants, and supervisory experience. It also investigated the relationships between third-party role behavior, dispute outcome, and disputants' perceptions of fairness.

The differences between managerial and formal or institutional third parties have stimulated research on roles adopted by managers acting as third parties to a dispute and the implications of those role behaviors. Sheppard (1984) developed a four-role typology of managerial third-party inter-

vention: inquisitor, judge, mediator, and motivator. In the inquisitor role, a third party retains control over both the presentation of evidence and the decision; in the judge role, the third party controls the decision but allows disputants control over the presentation of evidence; in the mediator role, the third party exercises no direct control over the decision but exercises some control over the presentation of evidence. Although these three roles are similar to legal third-party roles, Sheppard's fourth role, motivator, is unique to managers; in this role, a manager uses threats and incentives to help resolve a dispute.

Studying organizational ombudsmen, Kolb (1986) found that managers used three types of third-party intervention. She called those roles advisor, investigator, and restructurer. Advisors act as counselors to the disputants; investigators search for and report relevant information; and restructurers use their organizational authority to change reporting relationships and responsibilities.

Any role that allows a third party to exercise decision control will ensure a relatively quick resolution of a dispute and so be favored by managers (Sheppard, 1984, 1985), but the resulting outcome may be not be as effective as one that the disputants develop (Karambayya & Brett, 1989). In prior research, we found that the role played by a third party had implications not merely for the outcome of a dispute, but for the disputant's perceptions of the fairness of the outcome and the procedure used (Karambayya & Brett, 1989). Fair procedures contribute to the effectiveness of dispute resolution because they improve satisfaction with the resolution, foster better relationships between the parties, and prevent the recurrence of the dispute (Lind & Tyler, 1988; Thibaut & Walker, 1975; Ury, Brett, & Goldberg, 1988). Also, if managers are interested in maintaining an image of fairness (Greenberg, 1990), they are likely to be concerned about whether subordinates and peers see them as fair in all their managerial roles, including that of third party in organizational disputes. Thus, in choosing third-party roles, managers may have to balance such benefits of authoritarian methods as the speed and certainty of resolution against the costs of such methods in terms of the satisfaction of the disputants, post-dispute relationships, and recurrence.

HYPOTHESES

This study investigated whether managerial third parties with formal authority over disputants differ from those with no formal authority and whether managers with supervisory experience differ from those with less experience in the methods they use to resolve disputes. We also tested whether managers' third-party role behavior has implications for the outcomes of disputes and disputants' perceptions of fairness.

We expected managers with formal authority to use it either to decide how a dispute should be resolved, or to motivate the disputants to agree to what the manager wants (Sheppard, 1984). When a powerful actor inter-

venes in an organizational dispute, two issues likely to be important are the intervener's own interests and his or her positional power (Murnighan, 1986).

In contrast, a third party who is the disputants' peer may express an opinion about how the dispute should be resolved but have no formal power to enforce that opinion. Kolb (1986) found that ombudsmen, who do not have formal organizational authority over disputants, take roles that do not involve imposing an outcome on them. Advisors focused on facilitating communication; investigators looked for and presented relevant information. Restructurers used their organizational position to change the situation, by altering either the reporting relationships or the task interdependence of the disputants.

The lack of authority associated with the peer role may cue third-party behaviors focused on helping the disputing managers resolve their dispute, rather than on selling the third party's ideas about how the dispute should be resolved.

> Hypothesis 1: *Managers with formal authority over disputants are more likely than those with no such authority to take on the roles of decision maker and motivator and less likely to take on the role of mediator.*

Managers who are experienced supervisors may have learned by trial and error that disputing subordinates who must work together to implement a decision once it has been made are more likely to do so if they were involved in the development of that decision than if they were merely told what to do. Managers at high organizational levels are more likely than those at low levels to share power with their subordinates (Heller, 1971, 1981). Managers may also resist using their authority if they want to "look fair" (Sheppard, Saunders, & Minton, 1988). Experienced managers may also have a longer time perspective than novice managers and be more likely to use facilitative third-party roles because they lead to better or more durable solutions (Neale, Pinkley, Brittain, & Northcraft, 1990).

> Hypothesis 2: *Managers with lengthy supervisory experience are less likely than those with little experience to use authoritarian behaviors and more likely to use facilitative behaviors in trying to resolve disputes among subordinates and peers.*

In our previous research (Karambayya & Brett, 1989), the behavioral emphases of third parties affected the outcomes of disputes. When a third party emphasized decision-making and motivational roles, the outcome was more likely to be one-sided, favoring one disputant over the other. When the third party emphasized the facilitative role of mediator, the outcome was more likely to be a compromise incorporating at least some of each disputants' demands.

> *Hypothesis 3: When a third-party manager takes a facilitative, rather than an authoritative role, the outcome of a dispute is more likely to incorporate the concerns of both disputants.*

If the third party is a peer and emphasizes the role of decision maker or motivator, or both, the disputants may resist being told what is best for them by someone who has no authority and reach an impasse.

> *Hypothesis 4: When a peer behaves like a decision maker or motivator, the outcome of a dispute is more likely to be an impasse.*

Perceptions of distributive, procedural, and third-party fairness are identifiably distinct constructs but are typically intercorrelated (Lind & Tyler, 1988). That interrelationship is probably due to the common effect outcome has on each construct. In general, disputants perceive the outcome of a dispute, the procedure used, and the third party involved as more fair when they win their dispute than when they lose it (Brett & Goldberg, 1983; Karambayya & Brett, 1989). However, disputants also see compromises that are generated through mediation as fair (Brett & Goldberg, 1983; Karambayya & Brett, 1989).

> *Hypothesis 5: Disputants will rate the outcome of a dispute, the procedure used, and the third party involved higher on fairness when the outcome either favors them or is a compromise than they will when the outcome favors the disputant or is an impasse.*

In a managerial dispute resolution context, evaluations of fairness appear to be closely associated with the procedure used (Lind & Tyler, 1988) and with interaction between the parties (Greenberg, 1990). Disputants prefer procedures that offer them a chance to express their opinions to those that are unilateral and allow them little or no chance to participate. Third parties who mediate are likely to be rated higher on procedural and third-party fairness than are those who do not. Third parties who use the decision-maker or motivator roles are likely to be rated lower on procedural and third-party fairness than those who do not.

> *Hypothesis 6: When a third party takes the mediator role, disputants will judge the procedure used and the third party to be fairer than they will when the third party takes the role of decision maker or motivator.*

METHODS

Subjects

Subjects were students in the M.B.A. or executive management programs at a large university. They participated in the simulation for this study as a class exercise; completing the post-simulation questionnaire was op-

tional, but less than 2 percent refused. The M.B.A. students (69% of the subjects) were on the average 25 years old. The executive students (31% of the subjects) averaged 35 years of age. Of all subjects, 70 percent were male, 98 percent had at least a college degree, and 99 percent had full-time work experience (4 years for the M.B.A. students, 14 years for the executives). The M.B.A. students averaged 1.53 years of supervisory experience; the executives, 10.73 years.

Simulation

An organizational simulation was created for a research project of which the present study is a part (Brett & Karambayya, 1989). The simulation represents an emotionally charged dispute between members of a project team in which a third party is asked to intervene. The two disputants are at the same organizational level and are responsible for different aspects of the hypothetical project. Two versions of the simulation were used: in one, the third party was the disputants' supervisor; in the other, the third party was a peer at the same level in the organization as the disputants. In both versions of the simulation, the third party had a contingency fund of $15,000. This fund allowed the third party to use motivational control by offering to use the money to, for example, hire extra programmers to complete the project on budget and meet the deadline. Providing both peers and supervisors with the contingency fund acted as a control, so that differences between the peer and supervisory role could not be attributed to differences in access to resources.

Procedures

Subjects were randomly assigned to the role of disputant or third party and to one of the two experimental conditions (third party a supervisor or third party a peer). We gave each subject a general description of the dispute scenario and specific instructions for the role to which they were assigned. Groups had 45 minutes to resolve the dispute, at the end of which time each subject filled out a questionnaire. In pretests of the simulation, groups that were unable to reach a resolution in that time were generally unable to do so given more time.

Subjects who played the role of disputant reported on the behavior of the third party in their group and evaluated the fairness of the outcome, the procedure, and the third party. Those who played the role of third party completed a manipulation check, reported on the outcome of the simulation, and described their own behaviors in the third-party role. For each analysis, we deleted the responses with missing values on the variables, so the number of responses varied marginally for each analysis. Of the 372 responses, an average 21 were deleted because data were incomplete. The simulation was used as part of a teaching module on organizational dispute resolution. The subjects had no formal training in third-party intervention prior to the session, although most of them had read material on legal third-party roles. We

instructed them to use the simulation material to create any third-party role that might help resolve the dispute.

Measures

Third-party role behavior. Third-party role behavior was measured with 24 items based on those used by Karambayya and Brett (1989) and the typologies developed by Sheppard (1983, 1984) and Kolb (1986). The response format was a five-point scale with anchors ranging from "strongly agree" to "strongly disagree." We factor-analyzed the data provided by the disputants describing the third party's behavior and used the resulting structure to create scales for third-party roles.

Procedural fairness. Two items were used to measure procedural fairness, one on the fairness of the procedure and the other on satisfaction with it. Although satisfaction with a procedure and its fairness are somewhat different conceptually, it is common practice among procedural justice researchers to combine the two (Lind & Tyler, 1988). The interitem correlation coefficient was .67 ($p < .01$). An interitem correlation of .67 for a two-item scale is considered equivalent to a Cronbach's alpha reliability of between .75 and .88 (Carmines & Zeller, 1979).

Distributive fairness. Respondents were asked to assess the fairness of the outcome and their satisfaction with it. We combined answers to these questions. The interitem correlation coefficient was .74 ($p < .01$).

Third-party fairness. Disputants were asked how much the third party had considered their feelings and opinions, how much the third party favored one of them over the other, and how much respect was shown them. The four-point measurement scale for these items was anchored "a lot," "some," "a little," and "not much at all" ($\alpha = .64$). Since validity is a function of reliability, the correlations between the independent variables and third-party fairness may be lower than those between the independent variables and procedural or distributive fairness because of the reliability of third-party fairness.

Outcome. Type of outcome was measured by asking the subjects to place the result of their meeting in one of four categories: impasse, outcome favoring one or the other disputant (two categories), or compromise. Compromises were reported 76 percent of the time; impasses, 5 percent of the time, and outcomes favoring one or the other disputant, 19 percent of the time.

Who made the decision. Subjects were asked to indicate who made the final decision in their group: the disputants, the third party, or all three parties. Sixteen percent of the disputants reported that they made the decision, 14 percent said that the third party made it, and 70 percent said that the disputants and the third party made the decision jointly.

RESULTS

Manipulation

The manipulation of third-party status was effective. A significant chi-square ($\chi^2 = 227.58$, $p < .01$) indicated that subjects accurately perceived

their third party as a supervisor or a peer. Although 10 percent of the subjects erred in their perception of the manipulation, we nevertheless included them in analyses testing hypotheses. Their inclusion increases error variance and generates a conservative estimate of the effects of the manipulation.

Third-Party Role

Disputants' descriptions of their third-party's behavior were analyzed by maximum likelihood factor analysis. The scree plot showed a sharp drop in eigenvalues after two factors, indicating that a two-factor solution explaining 28.9 percent of the variance was the best fit. Table 1 shows the rotated factor structure. We considered items that loaded at or above .40 on one factor and below .40 on the other factors to define the factor on which they had the high loading and retained them in the scales formed from the factors.

The first factor explained 18.10 percent of the variation and had an eigenvalue of 4.34. It represented use of decision and motivational control

TABLE 1
Results of Factor Analysis[a]

Items	Factor 1	Factor 2
1. Imposed his/her ideas for settlement	**.77**	−.18
2. Forced own preferred decision on disputants	**.68**	−.34
3. Put pressure on disputants to adopt his/her ideas	**.65**	−.25
4. Made the final decision himself/herself	**.61**	−.11
5. Thought his/her approach was best	**.61**	−.12
6. Had his/her unique view of how dispute should be resolved	**.58**	.08
7. Persuaded disputants to adopt his/her preferred solution	**.50**	.18
8. Proposed his/her ideas for a settlement	**.48**	.28
9. Put pressure on disputant he/she thought was wrong	**.47**	−.18
10. Let the disputants work out a settlement themselves	**−.55**	.14
11. Tried to incorporate disputant's ideas	−.03	**.65**
12. Listened to disputant's point of view	−.17	**.55**
13. Asked relevant and insightful questions	−.03	**.55**
14. Allowed each disputant a chance to ask questions and offer rebuttals	−.10	**.49**
15. Encouraged disputants to seek inventive solutions	−.15	**.47**
16. Described the procedure	.13	**.46**
17. Offered resources to help resolve dispute	.21	**.45**
18. Did not always keep track of new information changes and options	.00	**−.47**
19. Showed little concern for views and interests of disputants	.15	**−.56**
20. Predicted the outcome of failure to reach agreement	.29	−.05
21. Strictly enforced procedural rules	.10	.05
22. Allowed interruptions	.01	−.07
23. Kept the procedure focused on resolution	−.06	−.39
24. Offered the disputants incentives	−.08	.33
Eigenvalue	4.34	2.60
Percent of variance explained	18.10	10.80

[a] Loadings shown in boldface type were retained in the scales formed from the factors.

by the third party. We labeled the scale created from the ten items loading on this factor "autocratic" (α = .84).

The second factor explained an additional 10.80 percent of the total variation and had an eigenvalue of 2.60. This factor reflected third-party behaviors geared toward helping the disputants settle their own dispute. The scale created from the nine items loading on this factor was labeled "mediational" (α = .77).

Table 2 shows the means, standard deviations, and correlations between the independent and dependent variables. The pattern of correlations reflects the predicted pattern of relationships. For example, the two third-party role behaviors were negatively correlated; autocratic behavior was negatively correlated with procedural fairness and third-party fairness; mediational behavior was positively correlated with procedural, distributive, and third-party fairness; and supervisory experience was correlated negatively with autocratic behavior.

Effect of Third-Party Role Status

The results partially supported Hypothesis 1. Third parties with formal authority over the disputants were more likely to behave autocratically ($\bar{x}$ = 28.57, s.d. = 7.02, N = 171) than those who were peers of the disputants ($\bar{x}$ = 25.77, s.d. = 6.85, N = 186; $F_{1,324}$ = 11.91, p < .01). However, peer third parties ($\bar{x}$ = 34.74, s.d. = 4.50, N = 186) were no more likely than those with formal authority over the disputants ($\bar{x}$ = 35.04, s.d. = 4.57, N = 171) to engage in the facilitating role behavior of a mediator ($F_{1,324}$ = .07, n.s.).

A chi-square analysis testing the relationship between third-party role assigned and who made the decision in a group also supported Hypothesis 1. Of the third parties taking the role of supervisor, 22 percent made the decision about how the dispute was to be resolved, compared with only 8 percent playing the role of peer. On the other hand, 24 percent of the peer third parties were reported to have allowed the disputants to participate in making that decision, compared with only 7 percent of the supervisors.

TABLE 2
Summary Statistics and Correlations[a]

Variables	Means	s.d.	1	2	3	4	5	6
1. Third-party status	1.46	0.50						
2. Supervisory experience	4.31	5.75	−.03					
3. Procedural fairness	8.17	1.59	−.04	.12				
4. Distributive fairness	7.99	1.72	−.03	.02	.70**			
5. Third-party fairness	10.90	1.94	−.14	.13	.47**	.37**		
6. Autocratic role	27.09	7.02	.21**	−.16**	−.20**	−.12	−.35**	
7. Mediational role	34.75	4.50	.02	.06	.39**	.31**	.57**	−.14**

[a] N = 351
** p < .01

Effect of Third-Party's Supervisory Experience

We conducted a series of regression analyses to determine whether supervisory experience outside the simulation also affected third-party behavior. The results supported Hypothesis 2. Supervisory experience had a direct effect, independent of the effect of assigned role, on autocratic behavior $(F_{2,339} = 10.63, p < .01, R^2 = .06)$. Third parties with high supervisory experience were less likely to act autocratically $(\overline{x} = 26.11, \text{s.d.} = 6.92, N = 109)$ than those who had low supervisory experience $(\overline{x} = 27.64, \text{s.d.} = 6.86, N = 247)$.

The effect of supervisory experience on the use of the mediational role depended on whether the third party was a supervisor or a peer. The main effects of supervisory experience and third-party status on the use of the mediational role were insignificant; however, the interaction significantly predicted mediational behavior $(\Delta F = 6.7, p < .01; F_{3,338} = 3.07, p < .05, R^2 = .03)$. In order to interpret the interaction, we dichotomized supervisory experience at the mean for our data. Third parties who were assigned to the role of supervisor and had greater than the average supervisory experience were the most likely of our subjects to mediate $(\overline{x} = 35.87, \text{s.d.} = 4.46, N = 55)$. Third parties assigned to the supervisory role who had less than the average supervisory experience $(\overline{x} = 34.64, \text{s.d.} = 4.59, N = 116)$, and all those assigned to the peer role mediated significantly less $(\overline{x} = 34.74, \text{s.d.} = 4.50, N = 186)$.

Role Behavior and Dispute Outcome

The data also confirmed Hypothesis 3 (see Table 3). When third parties used authoritarian roles, one-sided outcomes or an impasse were more likely. Groups in which third parties mediated were more likely to reach compromise solutions.

Hypothesis 4 was supported. As predicted, the interaction of third-party role and autocratic behavior affected the type of outcome $(F_{3,337} = 2.91, p < .05)$. When peer third parties behaved autocratically, impasses were more likely.

TABLE 3
Role Behavior and Dispute Outcome

| | Third-Party Role | | | | |
| | Autocratic | | Mediational | | |
Outcomes	Means	s.d.	Means	s.d.	N
1. Impasse	27.42	7.91	30.66	4.93	19
2. Outcome favoring disputant 1	31.78	7.86	32.34	6.65	44
3. Outcome favoring disputant 2	27.34	8.24	34.82	4.57	28
4. Compromise	26.32	6.54	35.43	3.91	272
$F_{3,337}$	7.06**		10.99**		

** $p < .01$

Effects of Type of Outcome on Fairness Judgments

Table 4 shows that, consistent with Hypothesis 5, disputants rated the outcome, the procedure, and the third party as more fair when there was a compromise or when they reported winning the dispute than they did when the other party won or there was an impasse.

Effects of Role Behavior on Fairness Judgments

The data supported Hypothesis 6. Judgments of procedural justice were positively associated with mediational behavior (β = .37, p < .01) and negatively associated with autocratic behavior (β = −.15, p < .01; $F_{3,327}$ = 23.36, p < .01). Judgments of third-party fairness were also positively associated with mediational behavior (β = .55, p < .01), and negatively associated with autocratic behavior (β = −.25, p < .01; $F_{3,327}$ = 81.54, p < .01).

DISCUSSION

This study extends the theory of managerial third-party dispute resolution in three ways. First, it identifies how supervisors and peers differ in their approaches to dispute resolution. Second, it identifies the important role that supervisory experience plays in affecting managers' dispute resolution behaviors. Third, it corroborates prior research on managerial third parties by showing that the use of autocratic and mediational third-party role behavior affects disputants' judgments of fairness. Each of these theoretical extensions has implications for management training.

The results of this study suggest that third parties who are supervisors are likely to use both autocratic and mediational behaviors to resolve disputes. Third parties who are peers, on the other hand, generally refrain from using autocratic behaviors; they rely instead on mediational behaviors and

TABLE 4
Dispute Outcome and Fairness Judgments

	Fairness Judgments						
	Distributive		Procedural		Third-Party		
Outcomes	Means	s.d.	Means	s.d.	Means	s.d.	N
1. Impasse	4.53	1.23	5.70	1.82	9.23	2.53	17
2. Outcome favoring self	8.65	1.05	8.22	1.43	10.19	2.57	31
3. Outcome favoring other disputant	5.84	1.72	6.36	1.73	9.24	2.81	25
4. Compromise	8.36	1.32	8.48	1.21	11.27	1.51	256
$F_{3,297}$	90.25**		52.64**		16.85**		

** p < .01

involve the disputants in constructing a resolution of the dispute. When peers do use autocratic behaviors and try to impose their own ideas for settlement on disputants, an impasse is likely.

Supervisory experience also seems to influence the use of autocratic third-party behaviors. Third parties who have much supervisory experience refrain from using autocratic role behaviors, regardless of their formal authority. Thus, peers—who generally refrain from using autocratic behaviors—may be more effective third parties than low-experience supervisors, if disputants' judgments of fairness and their compliance with the terms of the resolution are used as indicators of effectiveness.

Experienced supervisors are particularly likely to use mediational behaviors to resolve disputes when they have the authority to resolve the dispute. These findings suggest that with increasing supervisory experience, managers may learn that mediational third-party role behaviors pay off in better-quality outcomes.

The interpretation of the results of this study needs to be tempered by a recognition of its strengths and limitations. The study used a simulation of a dispute that ensured experimental manipulation of the formal authority of the third party over the disputants. It provided a setting that required third parties to act and disputants to judge their actions. To be sure, in order to simulate third-party intervention, subjects were asked to assume that the disputants were unable to resolve the dispute and were therefore appealing to the third party for help. It is likely that at least some of the disputants would have been able to resolve the dispute themselves, had they been allowed to try. Pretests of the simulation material indicated, however, that the dispute was not easy to resolve, and some groups were unable to resolve it even with the help of a third party. The level of participant involvement in simulations like this one is typically high. Students self-selected into the classes in which data were collected. And since results were shared with the entire class during debriefing sessions, motivation was high.

The use of a simulation did not allow a replication of the long-term pattern of interaction between parties, an important characteristic of organizational disputes. Previous interaction between the parties to a dispute may form the basis for a third party's role choice (Kolb, 1986). Whether similar disputes are likely to arise in the future, and how much future interaction is anticipated between the parties, may also influence third-party dispute resolution (Lewicki & Sheppard, 1985). Although this study demonstrates that third-party authority and supervisory experience affect role behavior, outcome, and judgments of fairness, it was not designed to identify the range of influences that may affect choice of a third-party role. Future research may provide a thorough assessment of such factors and determine their relative importance (cf. Neale et al., 1990).

The subjects in the study were all students. However, essentially all had work experience upon which to draw in role playing, more than half were working full time, and 30 percent had over five years of supervisory experience.

Subjects had access to reading material on legal third-party roles. However, since both the manipulation and prior supervisory experience influenced third-party behavior, the reading material did not appear to have a leveling effect on third-party behavior.

The study also provides a basis for developing programs to train managers to play third-party dispute resolution roles effectively. The results demonstrating a relationship between third-party behavior and fairness judgments suggest that training programs should emphasize mediational and facilitative roles. Although managers playing third-party dispute resolution roles may ultimately decide to behave autocratically, in doing so they may risk violating norms of fairness. The finding that the autocratic behavior of a third party who is a peer of the disputants was associated with reaching an impasse suggests that managers also should be warned of this negative effect of autocratic behavior. The evidence showing that managers with greater supervisory experience used fewer autocratic behaviors and more mediational behaviors when they had the formal authority to impose a decision suggests that feedback about the success of third-party dispute resolution behavior may be quite important in shaping what third parties do. Thus, training should provide feedback about disputants' perceptions of a third party's behavior and their judgments of the fairness of the process and the third party.

REFERENCES

Brett, J. M., & Goldberg, S. B. 1983. Grievance mediation in the coal industry: A field experiment. *Industrial and Labor Relations Review,* 37: 49–69.

Brett, J. M., & Karambayya, R. 1989. The Amanda project. In J. M. Brett (Ed.), *Materials for teaching negotiation and dispute resolution,* Evanston, IL.: Dispute Resolution Research Center, Kellogg Graduate School of Management, Northwestern University.

Carmines, E. G., & Zeller, R. A. 1979. *Reliability and validity assessment: Quantitative applications in the social sciences,* vol. 17. Beverly Hills, CA: Sage Publications.

Greenberg, J. 1990. Looking fair vs. being fair: Managing impressions of organizational justice. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior,* vol. 12: 111–157. Greenwich, CT: JAI Press.

Heller, F. A. 1971. *Managerial decision-making: A study of leadership styles and power-sharing among senior managers.* London: Tavistock.

Heller, F. A. 1981. *Competence and power in managerial decision making: A study of senior levels of organization in eight countries.* New York: Wiley.

Karambayya, R., & Brett, J. M. 1989. Managers handling disputes: Third-party roles and perceptions of fairness. *Academy of Management Journal,* 32: 687–704.

Kolb, D. M. 1986. Who are organizational third parties and what do they do? In R. J. Lewicki, B. H. Sheppard, & M. H. Bazerman (Eds.), *Research on negotiations in organizations,* vol. 1: 207–278. Greenwich, CT: JAI Press.

Lewicki, R. J., & Sheppard, B. H. 1985. Choosing how to intervene: Factors affecting the use of process and outcome control in third-party dispute resolution. *Journal of Occupational Behavior,* 6: 49–64.

Lind, E. A., & Tyler, T. R. 1988. *The social psychology of procedural justice.* New York: Plenum Press.

Mintzberg, H. R. 1975. The manager's job: Folklore and fact. *Harvard Business Review,* 53(4): 49–61.

Murnighan, J. K. 1986. The structure of mediation and intravention: Comments on Carnevale's strategic choice model. *Negotiation Journal,* 2: 351–356.

Neale, M. A., Pinkley, R. L., Brittain, J. W., & Northcraft, G. B. 1990. *Managerial third-party dispute resolution.* Final report submitted to Fund for Research in Dispute Resolution, Washington, DC.

Sheppard, B. H. 1983. Managers as inquisitors: Some lessons from the law. In M. H. Bazerman & R. J. Lewicki (Eds.), *Negotiating in organizations:* 193–213. Beverly Hills, CA: Sage Publications.

Sheppard, B. H. 1984. Third party conflict resolution: A procedural framework. In B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior,* vol. 6: 141–190. Greenwich, CT: JAI Press.

Sheppard, B. H. 1985. Justice is no simple matter: Case for elaborating our model of procedural fairness. *Journal of Personality and Social Psychology,* 49: 1–10.

Sheppard, B. H., Saunders, D. M., & Minton, J. W. 1988. Procedural justice from the third-party perspective. *Journal of Personality and Social Psychology,* 54: 629–637.

Thibaut, J. W., & Walker, L. 1975. *Procedural justice: A psychological perspective.* Hillsdale, NJ: Erlbaum.

Ury, W. L., Brett, J. M., & Goldberg, S. B. 1988. *Getting disputes resolved: Designing systems to cut the costs of conflict.* San Francisco: Jossey-Bass.

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INFLUENCE OF QUALITY OF WORK LIFE ON COMPANY AND UNION COMMITMENT

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This study examined changes in union and organizational commitment after the implementation of a joint union-management quality-of-work-life (QWL) program. The results indicated that company commitment increased only when participants perceived the QWL effort as success-ful, but union commitment increased irrespective of the perception of QWL success.

The purpose of the present investigation was to advance understanding of the influence of participation in a quality-of-work-life (QWL) endeavor on both company and union commitment. Although there are many definitions of QWL, there is agreement that in unionized organizations, QWL refers to a cooperative effort on the part of union and management representatives to involve employees in the day-to-day decision-making process at work. Such union-management efforts can affect both the company- and union-related attitudes of participants.

Commitment to a company and a union have been demonstrated to represent identical psychological constructs with conceptually similar an-tecedents and outcomes (Thacker, Fields, & Barclay, 1990). Participation, for example, is an antecedent of both company and union commitment. How-ever, given obvious organizational differences, the operational definition of participation is different in company and union settings; in a company con-text, it is participation in work decisions, but in a union context, members' interaction with union officers and the latter's responsiveness to member demands are key. Evidence from the dual commitment literature (Magenau, Martin, & Peterson, 1988; Thacker & Rosen, 1986) suggests that company and union commitment are not substantially correlated and are independent of each other. Given that companies and unions have different missions and goals as organizations, logic dictates that an organizational intervention would affect the two differently. This study tested two hypotheses regarding changes in company and union commitment after the implementation of a joint union-management QWL process. We predicted that in a QWL effort,

company commitment will increase only when employees perceive the intervention as successful but that union commitment will increase irrespective of the perception of success.

Most of the literature on joint union-management QWL programs is anecdotal, and the few studies that have been performed suffer from methodological inadequacies. Furthermore, although QWL is generally advocated as a joint union-management process, only a few studies have suggested that QWL participation results in positive outcomes for unions (Verma, 1989), and none have specifically examined union commitment. Most existing research has examined QWL participation from a company perspective. More research examining the specific influence of QWL on unions is needed, but it is even more important to examine outcomes for both company and union from the same intervention. Given that the QWL process is often considered a joint effort, both the company and union involved should benefit from the process.

HYPOTHESES

QWL and Job-Related Attitudes

Organizational commitment has been the focus of a great deal of research since Porter, Steers, Mowday, and Boulian (1974) developed a popular and widely used measure of this construct. Researchers have investigated commitment in a variety of settings and related it to a host of important organizational outcomes (Steers, 1977; Steers & Porter, 1983). In a discussion of antecedent factors, Steers and Porter hypothesized that structural influences and work experiences, such as increased participation, will foster organizational commitment. Therefore, a QWL intervention that allows individuals to increase their control over decisions affecting their work through greater participation should result in increased commitment to the employing company. However, we contend that in order for increased commitment to occur, the participants themselves have to believe that they indeed participated, which will only occur when they see the participative process as successful.

We also hypothesize that increases in job satisfaction will result from a successful endeavor. Studies that examine the relationship between satisfaction and commitment have suggested that satisfaction is an antecedent of commitment; others have concluded that they are reciprocal (Williams & Hazer, 1986). Porter and colleagues (1974) suggested that job satisfaction is changed more readily than organizational commitment, and we therefore concluded that job satisfaction is also likely to be affected by a successful QWL effort.

Proponents of job enrichment and quality-of-work-life intervention have cited specific improvements in job attitudes, specifically job satisfaction and organizational commitment, as expected outcomes of increased participation (Miller & Monge, 1986; Steers & Porter, 1983; Walton, 1985).

Furthermore, Fields (1982) argued that global improvements in outcomes are not to be expected from participation in an intervention alone but will only result when participants see an intervention as successful. From a phenomenological perspective, only individual beliefs regarding success will affect individual outcomes. Although objective improvements should be related to perceptions of success, some individuals will not perceive an intervention as successful no matter what objective changes occur. It is highly unlikely that such disenchanted workers would ever become more committed to their company. Thus,

> *Hypothesis 1: Organizational commitment and job satisfaction will increase after the implementation of a QWL effort only when participants perceive the effort as successful.*

QWL and Union-Related Attitudes

Gordon, Philpot, Burt, Thompson, and Spiller (1980) developed a measure of members' commitment to their union that has generated considerable research. They found that union commitment was composed of four distinct factors: loyalty to the union, responsibility to it, willingness to work for it, and belief in unionism. This specific factor structure has been widely replicated in a variety of settings and on a variety of populations (Ladd, Gordon, Beauvais, & Morgan, 1982; Thacker, Fields, & Tetrick, 1989).

Research has identified a variety of important outcomes associated with union commitment that parallel the outcomes of company commitment. These include union participation, support for union political activity, and meeting attendance and voting (Fields, Masters, & Thacker, 1987; Fukami & Larson, 1984; Fullagar & Barling, 1989; Thacker et al., 1990). None of these studies, however, has focused specifically on the effects of QWL or participation in the workplace.

The traditional role of unions is to negotiate collective agreements and to protect their members by ensuring that managements adhere to the terms of the agreements. Although the constructs that affect union commitment are the same as those affecting company commitment, events at a workplace will not have the same effects on company and union commitment. Verma (1989) found that a union's involvement in joint union-management endeavors is more likely to result in positive than in negative outcomes for the union. Furthermore, although not specifically addressing QWL, our previous research (Fields & Thacker, 1985; Thacker & Fields, 1987a) has demonstrated that the specific behaviors required of union officials as a function of their active participation in a joint QWL effort will, in and of themselves, improve rank-and-file attitudes to the union. Participation in a QWL effort like the one investigated in this study requires union officials to spend time at meetings of QWL committees representing the rank-and-file membership on nontraditional issues. This attendance results in increased interacting with members to solicit their input and increased visibility for the union officials.

Through QWL involvement, union officials are therefore able to serve the needs of the silent majority, the members not typically involved with the union. Union commitment, unlike company commitment, is represented by four distinct factors, all of which should be affected by union involvement in a QWL process. Several researchers (Holley, Field, & Crowley, 1981; Thacker & Fields, 1987b) have demonstrated that a majority of union members desire union-management cooperation. Therefore, QWL involvement in and of itself should improve union commitment because it fulfills a need of the membership. Although we hypothesize that rank-and-file commitment will increase on all four factors, this increase should be most profound for loyalty to the union. Researchers have considered loyalty most similar to Porter and colleagues' (1974) operational definition of company commitment, and it is also the most likely to be affected by external factors (Fukami & Larson, 1984; Fullagar & Barling, 1989; Thacker et al., 1990). Thus,

> Hypothesis 2: Union members will increase their commitment to their union on all four commitment factors— union loyalty and responsibility, willingness to work for the union, and belief in unionism—as a result of union involvement in joint union-management quality-of-work-life processes.

It is the behaviors of union officials associated with the start-up of a participative process, such as soliciting input and providing information, and not the success of the process that are hypothesized to influence member commitment to the union. If a QWL endeavor is not successful, union leaders may blame the lack of success on management, as we have demonstrated (Thacker & Fields, 1987).

METHODS

Organizational Setting and QWL Design

This research was conducted in a large midwestern utility involved in two separate joint union-management QWL interventions. The time spans of the efforts and the geographic location of the employees involved were the major distinction between the two interventions subsequently referred to as interventions 1 and 2 in this article.

In each intervention, the QWL effort began with the formation of a union-management steering committee, jointly initiated by union and management. Those parties took great care throughout the QWL endeavors to always represent them as equal union-management undertakings. The steering committee was composed of third-level managers and the presidents or vice presidents of the local unions, or both. Each steering committee represented all the utility's functional departments (construction, service, and so forth) in one of the geographic regions implementing QWL. Second-level teams were then created consisting of second level-managers and chief stewards. The second-level teams were divided along functional lines. Finally, grass-roots, problem-solving teams were chosen from specific functional

groups; they included a supervisor, a steward, and several volunteers from the rank and file. Each problem-solving team represented 20 to 50 rank-and-file employees.

All committee and team members received training in group-process skills and problem-solving techniques. If a problem-solving team did not have the authority to implement a specific solution, it made a presentation to the second-level committee, which either made the decision or referred the problem to the steering committee.

Design and Data Collection

The joint steering committee invited us to serve as independent evaluators for the QWL process. We gathered data through survey administrations to the same populations at two times, using a repeated-measures, within-respondents method. The initial surveys in both geographic regions were completed in the months prior to the start-ups of the interventions, immediately after announcements from union and management regarding the start-up. At each survey administration, participants were informed that their responses would be confidential. However, we employed a coding scheme to match the responses of each individual across the two survey administrations and used only data from respondents who completed both surveys. Surveys were administered to small groups of employees on company premises and on company time. Participation in the survey effort was strictly voluntary. To highlight the joint union-management nature of the QWL process, a company and union official were present at each survey administration to endorse the data collection process.

Respondents

There were 293 employees in intervention 1 and 119 employees in intervention 2 who completed surveys at both administrations. Although the total response rate at each administration was 75 percent, the loss of respondents between the first and second administration was approximately 50 percent. This reduction was primarily a function of promotions, transfers, vacations, company reorganizations, and turnover. Two local unions belonging to the same international union represented the employees in both groups. The leadership of both local unions remained constant throughout the investigation.

The time lag between survey administrations was 12 months in the first intervention and 32 months in the second intervention. (The potential confounding influence of these differing time lags is examined in Results.)

Measures

Company commitment. A nine-item, shortened version of the commitment scale developed by Porter and colleagues (1974) was used to measure company commitment ($\alpha = .89$).

Job satisfaction. A nine-item scale was developed for this study addressing overall satisfaction and intrinsic sources of job satisfaction ($\alpha = .76$).

Union commitment. We used a shortened version of the four-factor union commitment scale developed by Gordon and colleagues (1980) and reported by Thacker and colleagues (1989). *Loyalty to the union* was measured by eight items on the instrumentality of the union and member pride in association with it (Gordon et al., 1980) (α = .89). *Responsibility to the union* was requested by five items representing the degree to which an individual was willing to fulfill the day-to-day obligations of union membership (α = .72). *Willingness to work for the union* was assessed by three items (α = .80). Finally, *belief in unionism* was measured by three items indicating the degree to which an individual believed in the principles of unionism (α = .82).

Perceived QWL success. A single item on the second survey requested respondents to indicate on a seven-point Likert scale how successful they believed the QWL intervention had been to that point. Response categories included 7, very successful; 5, successful; 4, neither successful nor unsuccessful; 2, unsuccessful; and 1, very unsuccessful. In the correlational analyses we retained all seven response categories, but in the analyses of variance we collapsed them into three categories: successful, neither successful nor unsuccessful, and unsuccessful. This was done to increase all sizes, ease of interpretation, and conceptual simplicity.

QWL Issues

To monitor progress, we examined the minutes kept by the problem-solving teams. The minutes indicated that after the development of a charter stating their goals and objectives, environmental issues (picnic tables, coffee at workstations, cleaning, painting, and so forth) were the initial foci of each team's attention. At the time of the second survey, many teams were dealing with such substantive issues as removal of basic control systems for monitoring employees, consultation with architects regarding redesign of workplaces, redesign and standardization of work forms, implementation of staggered starting times to reduce crowding, and revision of work schedules. Teams addressed issues specific to their concerns. Although the issues were not identical for all teams, the minutes from each group indicated that a real intervention was in place.

Analyses

To test the hypotheses, we used a multivariate analysis of variance (MANOVA) with repeated measures.[1] In this design, six dependent measures were employed simultaneously: the four union commitment factors,

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[1] Golembiewski, Billingsley, and Yeager (1976) proposed a tripartite classification of the changes that can occur as a result of an organizational intervention. We propose that "alpha change," a change in the mean levels of the variables of interest, will occur as a function of QWL involvement. "Gamma change," a shift in the factor structure of the data, would confound the interpretation of alpha changes. To test for potential gamma change, we used the Ahmavaara (1954) procedure Golembiewski and colleagues suggested.

organizational commitment, and job satisfaction. The intervention and perceived QWL success were between-respondents variables. Finally, the time of administration was a within-respondents variable. We computed a full factorial model using the MANOVA procedure from the Statistical Package for the Social Sciences–Personal Computer, version 2.

Two additional analyses tested the direct influence of participation in the QWL process on relevant employee attitudes. At the second survey administration, we asked respondents whether they were (1) presently on a QWL team or (2) had ever been members of a team. We recomputed the MANOVA twice, substituting both present and prior team membership for perceived QWL success. Because the cells were small, it was not possible to analyze these variables in an inclusive multivariate design.

RESULTS

Table 1 shows the correlations among the variables. The pattern of correlations within and between the two survey administrations provides considerable evidence for the construct validity and reliability of the measures. The correlation matrix represents a form of multitrait, multimethod matrix, with the two sets of company and union variables corresponding to multiple traits and the two measurement times corresponding to multiple methods. The convergent and discriminant properties of the multiple methods as they are applied to the multiple traits provide evidence for the construct validity of the variables, particularly the job satisfaction measure developed specifically for this study.[2]

The time 1 measures for the four union commitment factors display moderate intercorrelations (.35–.57). The company variables, job satisfaction and company commitment, are correlated with each other (.61); however, as would be expected in an analysis of multiple traits, the company variables are not correlated so highly with the union variables (.02–.26). This pattern is replicated in the results of the second survey administration. Furthermore, the time 1–time 2 correlations (multiple methods) are higher for the same variable (.56–.69) than they are for different variables (.01–.48). This pattern provides evidence for test-retest reliability, convergence, and divergence.

In the repeated-measures MANOVA, we tested all multivariate effects using an approximate F-statistic based on Wilks-Lambda criteria (Hair, Anderson, & Tatham, 1987). The first hypothesis is addressed in the interaction of time of measurement and perceived QWL success. We tested Hypothesis 2 by looking for a main effect for time of measurement.

Significant multivariate main effects were detected for time of measurement ($F = 5.83$, $p < .01$), intervention ($F = 4.70$, $p < .01$), and perceived QWL success ($F = 6.04$, $p < .01$). Only one significant multivariate two-way interaction was detected, for time of measurement by perceived QWL suc-

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[2] In the tests for gamma change, all the coefficients of congruence were above .86.

TABLE 1
Summary Statistics and Correlations[a]

Variables	Means	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
First administration																
1. Loyalty	24.0	5.6														
2. Responsibility	17.4	3.0	.35													
3. Belief in unionism	9.9	2.5	.57	.39												
4. Willingness	6.3	2.3	.54	.39	.38											
5. Organizational commitment	43.0	10.1	.19	.02	-.10	.10										
6. Job satisfaction	29.5	5.4	.26	-.09	-.04	.09	.81									
Second administration																
7. Loyalty	25.0	5.5	.69	.23	.40	.42	.16	.22								
8. Responsibility	17.6	2.8	.23	.56	.28	.24	-.02	-.05	.35							
9. Belief in unionism	9.7	2.5	.45	.33	.65	.36	-.07	-.03	.60	.41						
10. Willingness	8.5	2.4	.44	.27	.26	.64	.08	.09	.60	.42	.48					
11. Organizational commitment	43.9	9.9	.12	-.05	-.07	.02	.56	.43	.19	-.04	-.13	.01				
12. Job satisfaction	29.3	5.5	.20	-.02	-.01	.05	.40	.58	.26	-.02	-.04	.04	.61			
13. Perceived QWL success	3.6	1.5	.09	-.16	-.10	-.02	.16	.15	.15	-.10	-.11	.01	.38	.39		
14. Present QWL membership[b]			.03	.01	-.01	.08	-.04	-.12	.04	-.02	-.02	.07	-.05	-.07	.14	
15. Prior QWL membership[b]			-.07	-.05	-.10	.02	.00	-.02	-.01	.01	-.02	.10	.01	-.03	.13	.54

[a] If $r \geq .11$, $p < .01$.
[b] No mean is reported as this was a dichotomous measure.

cess ($F = 3.22$, $p < .01$). The lack of significance for the interaction of intervention and time of measurement suggests that the 12- and 32-month time lags between survey administrations in the two groups did not cause differing results.

Univariate analyses of variance were computed for all significant main effects and interactions. Univariate analyses for the multivariate time effect indicated that only loyalty to the union ($F = 19.5$, $p < .01$) and responsibility to the union ($F = 5.3$, $p < .05$) varied over the two time periods in this study. The descriptive statistics indicated that the mean levels for both variables increased over time.

Univariate analyses for the intervention effect indicated a significant difference only for loyalty to the union ($F = 9.8$, $p < .01$). The results suggest that respondents from intervention 1 displayed higher levels of loyalty to the union than did those from intervention 2. Perceived QWL success generated significant univariate effects for five of the six dependent variables: loyalty to the union ($F = 5.4$, $p < .01$), responsibility to the union ($F = 5.4$, $p < .01$), belief in unionism ($F = 3.4$, $p < .05$), job satisfaction ($F = 14.6$, $p < .01$), and organizational commitment ($F = 20.8$, $p < .01$). Finally, the interaction of perceived QWL success and time of administration generated significant effects only for organizational commitment ($F = 7.5$, $p < .01$) and job satisfaction ($F = 13.7$, $p < .01$), the two company-related variables. The descriptive statistics indicate that when the QWL intervention was perceived as successful, satisfaction and organizational commitment increased, and when the QWL intervention was perceived as unsuccessful, they decreased.[3]

The two additional analyses described in the Methods section revealed no significant main effects or interactions for either present or past team membership affecting any of the dependent variables. Participation in the QWL process as a team member did not influence changes in either company or union commitment.

DISCUSSION

The results of this study provide support for its two hypotheses.[4] Both union and company commitment increased after employee's involvement in a joint QWL process. However, the underlying dynamics of these changes differ for union and company commitment.

Company Commitment

There was no overall change in company commitment and job satisfaction. They only varied as a function of the moderating influence of perceived

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[3] These data have been omitted to conserve space but are available upon request.

[4] There is considerable evidence for our contention that alpha change, not gamma change, is present. First, an examination of the correlations among the six variables at time 1 and time 2 indicates that there are consistent stable relationships among these within the two measurement intervals. In addition, the coefficients of congruence provide further evidence that no gamma change was present in the data.

QWL success, supporting our initial hypothesis that in order for reactions to an employing organization to improve in a QWL process, participants must see the effort as successful. Thus, there is a burden on company officials that does not appear to affect union officials. Positive changes in relevant company attitudes will occur only when participants perceive that the effort has been successful.

The additional analyses involving past and present team membership have direct implications for understanding the influence of QWL on company-related attitudes. The additional analyses uncovered no significant effects that were attributable to participation in the QWL process. This lack is consistent with Marks, Mirvis, Hackett, and Grady's (1986) findings that employees' involvement in quality circles, another form of participative process, does not influence general attitudes regarding company and work. These combined findings amplify the importance of investigating individual perceptions of the success of a participative process. Participation in a QWL process does not in and of itself influence reactions, but the perceived success of the endeavor does do so. Future researchers should emphasize determining the perceived success of interventions and the individual level of analysis when investigating QWL and related processes.

Union Commitment

Between the first and second survey administrations, loyalty to the union and responsibility toward it significantly increased. Two of the four union commitment factors did not change; therefore, the second hypothesis was only partially supported. These findings are consistent with those of Fukami and Larson (1984); they found that the loyalty factor was conceptually similar to operational definitions of organizational commitment and more likely than the other three commitment factors to be correlated with external variables. This pattern of results reinforces the arguments for a multivariate view of union commitment made by Gordon and colleagues (1980) and Thacker and colleagues (1990). Additional research will be required to determine what external factors, if any, affect belief in unions and willingness to work for a union.

The findings regarding union loyalty and responsibility are consistent with our earlier finding (Fields & Thacker, 1985) that changes in union commitment are a product of changes in the behavior of union officials. Thus, the specific behaviors of union officials associated with involvement in a QWL intervention result in improved attitudes. Members react positively when union officials show an active interest in work-related issues.

Limitations and Recommendations

These findings may be attributable to attitudinal consistency across the two time periods investigated. It is possible that individuals who initially possess positive attitudes evaluate QWL interventions as more successful than do those who are initially alienated. Although this may be true, other evidence suggests that the effect is not a strong one. Perceived QWL success

displays a differential pattern of correlations in terms of sign and magnitude both within and between the variables in this study across the two time periods. Alternatively, consistently high correlations of the same sign would evidence attitudinal consistency. In addition, team membership was for the most part uncorrelated with the variables in this study, suggesting that active involvement in the intervention is not related to attitudes.

Two particular issues raised here require additional research. Longitudinal research involving three or more measurements could determine if improvements in commitment continue over the long term. Additional long-term improvement in the union-related variables may be more contingent on the success of the intervention than was noted in the present investigation. Second, these findings should be replicated in different QWL interventions. In the present investigation, the union was a full partner in the QWL process; other structures may not result in similar findings.

REFERENCES

Ahmavaara, Y. 1954. Transformation analyses of factorial data. *Annals of the Academy of Science,* Series B, 88(1): 54–59.

Fields, M. W. 1982. The distribution of influence in an organizational setting: An examination of two paradigms. *Dissertation Abstracts International,* 44: 1268B.

Fields, M. W., Masters, M., & Thacker, J. W. 1987. Union commitment and membership support for political action: An exploratory analysis. *Journal of Labor Research,* 8: 143–157.

Fields, M. W., & Thacker, J. W. 1985. The impact of survey feedback upon member perceptions of the union. *Labor Law Journal,* 36: 477–483.

Fukami, C. V., & Larson, E. 1984. Commitment to company and unions: Parallel models. *Journal of Applied Psychology,* 69: 367–371.

Fullagar, C., & Barling, J. 1989. A longitudinal test of a model of the antecedents and consequences of union loyalty. *Journal of Applied Psychology,* 74: 213–227.

Golembiewski, R. T., Billingsley, K., & Yeager, S. 1976. Measuring change and persistence in human affairs: Types of change generated in OD designs. *Journal of Applied Behavioral Science,* 12: 133–157.

Gordon, M. E., Philpot, J. W., Burt, R. E., Thompson, C. A., & Spiller, W. E. 1980. Commitment to the union: Development of a measure and an examination of its correlates. *Journal of Applied Psychology,* 65: 479–499.

Hair, J., Anderson, R., & Tatham, R. 1987. *Multivariate data analysis* (2d ed.). New York: Macmillan Publishing Co.

Holley, W., Field, H., & Crowley, J. 1981. Negotiating quality of work life, productivity and traditional issues: Union members' preferred roles of their unions. *Personnel Psychology,* 34: 309–329.

Ladd, R. T., Gordon, M. E., Beauvais, L. L., & Morgan, R. L. 1982. Union commitment: Replication and extension. *Journal of Applied Psychology,* 67: 640–644.

Magenau, J., Martin, J., & Peterson, M. 1988. Dual and unilateral commitment among rank-and-file union members. *Academy of Management Journal* 31: 359–367.

Marks, M., Mirvis, P., Hackett, E., & Grady, S. 1986. Quality circles, quality of work life, and productivity. *Journal of Applied Psychology,* 71: 61–69.

Miller, K. I., & Monge, P. R. 1986. Participation, satisfaction and productivity: A meta-analytic review. *Academy of Management Review,* 29: 727–753.

Porter, L. W., Steers, R. M., Mowday, R. T., & Boulian, P. V. 1974. Organizational commitment, job satisfaction, and turnover among psychiatric technicians. *Journal of Applied Psychology,* 59: 603–609.

Steers, R. M. 1977. Antecedents and outcomes of organizational commitment. *Administrative Science Quarterly,* 22: 45–56.

Steers, R. M., & Porter, L. W. 1983. Employee commitment to organizations. In R. M. Steers & L. W. Porter (Eds.), *Motivation and work behavior* (3d ed.): 441–451. McGraw-Hill.

Thacker, J. W., & Fields, M. W. 1987a. *The application of organizational development to a union: A longitudinal investigation.* Paper presented at the 40th annual conference of the Industrial Relations Research Association.

Thacker, J. W., & Fields, M. W. 1987b. Union involvement in quality of work life efforts: A longitudinal investigation. *Personnel Psychology,* 40: 97–111.

Thacker, J. W., Fields, M. W., & Barclay, L. A. 1990. Union commitment: An examination of antecedent and outcome factors. *Journal of Occupational Psychology,* 63: 33–48.

Thacker, J. W., Fields, M. W., & Tetrick, L. 1989. Evidence for the four factors of union commitment: An application of confirmatory factor analysis. *Journal of Applied Psychology,* 74: 228–232.

Thacker, J. W., & Rosen, H. 1986. Dynamics of employee reactance to company and union: Dual allegiance revisited and expanded. *Relations Industrial,* 41: 128–144.

Verma, A. 1989. Joint participation programs: Self-help or suicide for labor? *Industrial Relations,* 28: 401–410.

Walton, R. E. 1985. From control to commitment in the work place. *Harvard Business Review,* 63(2): 77–84.

Williams, L. J., & Hazer, J. T. 1986. Antecedents and consequences of satisfaction and commitment in turnover models: A reanalysis using latent variable structural equation methods. *Journal of Applied Psychology,* 71: 219–231.

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SPECIAL RESEARCH FORUM CALL FOR PAPERS: CONFIGURATIONAL APPROACHES TO ORGANIZATION

The *Academy of Management Journal* is pleased to announce a call for papers for a Special Research Forum on Configurational Approaches to Organization. Guest co-editors for the forum will be Bob Hinings, Alan Meyer, and Anne Tsui.

Out of the theoretically infinite set of possible combinations of organizational attributes, some theorists and researchers contend that only a relatively small subset constitute viable combinations that may characterize organizations empirically. Various dimensions of organization environments, technologies, strategies, structures, cultures, ideologies, processes, practices, and members have been said to cluster into configurations, archetypes, or gestalts. The term "organizational configuration" is used here to denote any multidimensional constellation of conceptually distinct variables that commonly occur together.

The purpose of this Special Research Forum is to synthesize and extend knowledge about organizational configurations. Configurations may arise from typologies developed conceptually or from taxonomies derived empirically. They may be situated at multiple levels of analysis, depicting common patterns within departments, divisions, organizations, or networks of organizations. Different configurations exhibit different interrelationships among constituent variables, such that classifying social units into configurations enables prediction of significant differences along dimensions not used to make the classification. This might occur, for example, if grouping organizations on the basis of technologies justified inferences about their employees' motives, or if grouping interorganizational alliances on the basis of forms of governance justified inferences about the partners' internal structures.

Suitable papers could show, for instance, that identifying configurations has important implications for the existence or the form of relationships between variables, that classification along certain dimensions predicts counterintuitive differences along other dimensions, or that controlling for configurations resolves a long-standing dispute in the literature. Because covariates of configurations might range from occupying unique ecological niches to following unique HRM practices, submissions by authors from diverse disciplines and all professional divisions of the *Academy of Management* are invited.

Configurations are evidenced by diverse organizational outcroppings, so methods ranging from ethnography to simultaneous equations may be used in gathering and analyzing data. Papers focusing on discontinuous or punctuated equilibrium models of change would be appropriate, because the configuration approach implies that significant organizational change often will require near-simultaneous changes in a host of interrelated variables. Human brains are inclined to perceive patterns even among random arrays of objects, thus papers treating configurations as products of managerial and organizational cognitions fit the domain of this forum. Finally, because organizational configurations can influence and be influenced by phenomena at many levels of analysis, we encourage authors to investigate cross-level effects.

In preparing manuscripts, authors should follow standard *AMJ* requirements specified in *AMJ*'s "Style Guide for Authors." Cover letters should request that papers be considered for this Special Research Forum. Five copies should be sent to Professor Michael Hitt, *Academy of Management Journal*, College of Business Administration. Texas A&M University, College Station, Texas 77843-4221. Papers must be received no later September 1, 1992. All submissions will be blind reviewed in accord with *AMJ*'s normal review process and criteria. Prospective contributors wishing further information may contact Bob Hinings at (403)492-3054, Alan Meyer at (607)255-7134, or Anne Tsui at (714)856-4062.

SPECIAL RESEARCH FORUM CALL FOR PAPERS:
METHODOLOGICAL ISSUES IN MANAGEMENT RESEARCH

The *Academy of Management Journal* is pleased to announce a call for papers for a Special Research Forum on Methodological Issues in Management Research. Guest co-editors for this forum are Jean Bartunek, Philip Bobko, and N. Venkatraman.

The purpose of this special research forum is to encourage the development and application of innovative methodologies, innovative uses of traditional methodologies, and/or a more effective understanding of current methodologies applied to management research. The goal of this Special Research Forum is to stimulate approaches to the discovery of knowledge about organizations, thereby serving as a catalyst to future research in management.

Submissions must be methodologically focused on issues considered relevant to management inquiry. While statistical analysis is an important facet of research projects, this forum will not be devoted to describing the derivation of new statistics. In keeping with the *Journal's* empirical focus, submissions must be data-based. The topics considered should seek to demonstrate how a particular methodological orientation enhances (sharpens) our understanding in a substantive management content domain. Additionally, submitted manuscripts may demonstrate new facets of methodology and the applicability. Submissions that integrate across multiple methodological or disciplinary boundaries are particularly encouraged.

Examples that would fit the domain of this forum include a discussion of the limitations of LISREL applications in management research with substantive demonstration of problems or solutions; illustrations of how ethnographic methodologies can inform more traditional laboratory or questionnaire research (or the converse); the effects on both construct measurement and the resultant nomological net of correlations of different philosophical perspectives (e.g., about what difficulty means in goal-setting research or what effectiveness means for organizations); demonstrations of the use of discourse analysis and deconstruction in management research; the overlapping measurement needs for the research areas of organizational values, ethics, and performance appraisal. These illustrations are designed solely to spark creativity, not to constrain the types of methodology addressed.

In preparing manuscripts, authors should follow standard *AMJ* requirements specified in *AMJ's* "Style Guide for Authors." Cover letters should request that papers be considered for this Special Research Forum. Five copies should be sent to Professor Michael Hitt, *Academy of Management Journal*, College of Business Administration, Texas A&M University, College Station, Texas 77843-4221. Papers must be received no later than September 1, 1992. All submissions will be blind-reviewed in accord with *AMJ's* normal review process and criteria. Prospective contributors wishing further information may contact Jean Bartunek at (617)552-4006, Philip Bobko at (908)932-3565, or N. Venkatraman at (617)253-5044.

CORRECTION

On the cover and in the table of contents of the March 1992 *AMJ* (vol. 35, no. 1), Patrick E. Connor's last name was misspelled as Conner. His article is titled, "Decision-making Participation Patterns: The Role of Organizational Context." We apologize for the error and any inconvenience it may have caused.

Please send all address corrections to:

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